

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper — Second-class postage paid at Chicago, Illinois

Vol. IV No. 22

June 3, 1970

Price: \$9/year

Second Source Available

RCA Division Expands Services to All Users

By Edward J. Bride
CW Staff Writer

CAMDEN, N.J. — Users of all computer systems now have an alternative for complete system and maintenance support under a new policy announced by the

RCA Service Co.

The service company has decided to offer the expertise of its government services department to all users in a kind of "mini-merger" involving the combination of the government and com-

mercial maintenance and software departments.

Facilities management will also be offered to commercial users by the new computer support services department.

"We're not excluding any man-

ufacturer's equipment," said an executive of the service company, which is a division of the RCA Corp.

Noting IBM's prominence in the industry, an RCA spokesman said that at least 50% of the service personnel would be well-versed in IBM systems.

Spectra Excluded

The computer support services department will not compete with the parent company's Computer Services Division, which specializes in RCA equipment. According to an RCA spokesman, the Spectra computer line will be specifically omitted from the jurisdiction of RCA Service Co.'s new department.

Another RCA official noted that, for more than 15 years, "We have been programming, maintaining, and operating data systems manufactured by the leading hardware firms. We are now offering these services, to-

gether with systems analysis and facility management services, to a wider range of customers."

Byproduct

A "second source" thus is available for users unhappy with maintenance, prices, or timing of services provided by original vendors.

Although the company had been offering maintenance and service to the government for 15 years, the expansion is seen as one of the byproducts of IBM's unbundling. Some of these services had been offered free by IBM before the giant separated its pricing of hardware, software, and services a year ago.

Coast-to-Coast Next Year?

Joseph Basile, newly hired manager of computer service marketing, is charged with selling the combined services of the new department.

(Continued on Page 4)

Inexperienced Programmers Find Western Job Market Evaporating

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES — A survey of some major Western cities, Los Angeles, San Francisco, Seattle, Phoenix, and Dallas, shows an almost nonexistent job market for the programmer with one year or less experience. Sources in all cities reported employer specifications are for two, three, or four years' experience, and require experience on the employer's particular model of computer and in his languages.

The Phoenix Department of Employment reported that it has many programmers but few jobs. When asked what contributed to this condition, the department said that Phoenix industry is largely government-contract based and there have been cutbacks.

The department spokesman said: "We have lots of schools here turning out programmers

but the resistance to them is rough. Young people have to go out of state to get their experience; then they can move back.

"Public government organizations will hire about one inexperienced programmer every six months but private industry won't even do that. Some banks will hire a newcomer for the night shift but put him on operations work, not as a programmer.

"In a few cases they can move up to programmer after a while. The job market has definitely tightened in the last few months. It's a very bad employment situation here," he said.

One Opening

Seattle, the hardest hit of the Western cities with an unemployment rate of 8% compared to the national average of 4.8%, reported that commercial and scientific programmers were in

surplus as well as the trainees. The Seattle Department of Employment has only one programmer opening at the present, but it has, for example, 58 engineering programmer analysts in their fields. It also observed that there are few ads for local jobs in the papers.

In Los Angeles, the California Department of Human Resources reports a serious deteri-

(Continued on Page 4)

DPMA Expects 15,000-20,000 At June Convention in Seattle

By Thomas J. Morton
CW Midwest Bureau

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) will open its convention this year in Seattle,

Wash., at the end of this month, and it reports that "all the symptoms indicate this year's convention will be as well attended and as exciting as any, even last year's which was one of the best we've ever had."

While the times may not indicate too many chances for a success equal to last year's show in Montreal, the DPMA is optimistic. "The man going to DPMA is a little different from the usual convention-goer, even in the computer industry. He goes to DPMA to learn."

Although attendance at the SJCC was substantially down from Afips projections earlier this year [CW, May 13], the DPMA says that this year's pre-registration tallies are holding their own compared to previous years at this date.

Preregistration Tallies

Asked as to whether or not the Far West site would take its toll because of DP budget reductions and the reported slowdown in the West Coast's aerospace and defense contracts, the DPMA suggested that while there was a slowdown nationally, and a particular tightening on the West Coast, the DP departments and companies still existed in force and it was those people who would attend the show.

"People have always come to DPMA to learn more effective management and operational

techniques and to see the new equipment and systems to help them implement them," said Tom Waters, DPMA exhibits

(Continued on Page 2)

Mag Card Selectric Gets Communications

By Frank Piasta
CW Staff Writer

ARCADIA, Calif. — A new teleprocessing converter allows the IBM Mag Card Selectric (magnetic card data entry) unit to be used as a computer terminal.

Said by the manufacturer, Western Telematic, Inc., to transmit, receive, and record computer data 50% faster than

teletypewriters, the MCS Telecontrol is compatible with any remote computer or service that operates with a "2741-type" terminal.

The IBM Mag Card Selectric combines a 5,000 character magnetic card on-line data storage with a Selectric typing unit. It was designed to provide text editing and storage capability for secretarial and documentation applications.

When used as a terminal with the Telematic converter, the IBM unit's magnetic card is used to provide program and data entry, debugging and storage equivalent to 60 punched cards. At present, IBM does not offer this capability.

Data to be transmitted is typed and simultaneously recorded on the magnetic card. The recorded data can then be edited. Edited data is then transmitted, while a hard copy is also produced. Data being received by the terminal is recorded on the magnetic card and typed simultaneously.

An internal data set, similar to

a miniature 103 modem, is available with the converter as an option. This allows the connection of the unit directly to a Bell DAA device. Alternately, the Bell 103, 202 or IBM 2711 modems may be used.

1,200 Bit/Sec

Currently, the data rate of the system is limited to 15 char/sec by the speed of the typewriter assembly. However, a Telematic spokesman told CW that a buffer is under development for fall delivery that will allow rates up to 1,200 bit/sec.

Three models of the Telecontrol for use with EIA RS232B interfaces are available. The MCS-1 provides interface and control in serial 9-level, 7-bit format in standard correspondence code. Correspondence code is the basic coding of the Selectric typewriter and is used by most 2741 terminals. It is said to be compatible with IBM, Datel, or Dura "2741" correspondence code

(Continued on Page 4)

Midwest Bureau Opened by CW

CHICAGO — Computerworld has opened a news bureau at Suite 21B, 25 E. Chestnut St., Chicago. The offices also house Computerworld's Midwestern advertising staff under Midwest regional manager Bill Farrell.

The new bureau will be directed by Tomas J. Morton, formerly a correspondent and feature writer for International News Service and United Press International, and most recently engaged in software marketing management for the A.B. Dick Co. of Chicago.

The Chicago bureau will enable Computerworld to provide more complete coverage in the Midwest area — Detroit to Minneapolis, Chicago to Houston-Dallas.

Computerworld now has a network of three news bureaus. The western bureau, directed by Phyllis Huggins, is at 11661 San Vicente, Los Angeles, and E. Drake Lundell Jr. directs the eastern bureau at Suite 4C, 120 E. 34th St., New York.

On the Inside

Honeywell-GE — H200 Series Should Dominate

— Page 9

Computerized Teaching Brought Into Home

— Page 27

| | |
|---------------------|----|
| Business/Industry | 33 |
| Editorials | 10 |
| Education | 27 |
| Financial | 39 |
| Societies | 30 |
| Software/Services | 17 |
| Systems/Peripherals | 25 |

DPMA Expects 15,000 to 20,000 at Seattle Meeting

(Continued from Page 1)
manager, "and this year, maybe, that learning is more important than ever."

15,000 to 20,000

The DPMA anticipates an attendance of between 15,000 to 20,000, with approximately 3,500 conference registrants.

Convention activities begin Tuesday, June 23, and run through Friday, June 26, in the Seattle Center, the site of the 1962 World's Fair.

Registration begins Sunday, June 21 from 1 p.m. to 9 p.m.

at the Olympic Hotel; Monday, 8 a.m. to 9 p.m. at the Olympic; Tuesday, 8 a.m. to 9 p.m. at the Olympic; and 8 a.m. to 7 p.m. at the Alki Room of the Seattle Center; Wednesday and Thursday, 8:30 a.m. to 6 p.m. at the Olympic and 8 a.m. to 6 p.m. at the Seattle Center; Friday, 8 a.m. to noon at the Olympic and Seattle Center.

Registration fees are \$90 for members and \$105 for non-members for full registration. Full registration includes participation at four seminars, three of the conference lunches, one industry tour out of the five offered, the banquet, and the general assembly. Partial registrations are available.

Ninety exhibitors are scheduled to attend, and their displays will be in Exposition Hall and Display Hall in the Center. The times for visiting the exhibits are Tuesday, 1 to 7 p.m.; Wednesday and Thursday, 8:30 a.m. to 6 p.m.; and Friday, 8:30 a.m. to noon. A ceremony at 1 p.m. Tuesday by the DPMA executive committee officially opens the exhibits.

While no admission fee is charged for the exhibits, and while they are open to the general public, the DPMA told *Computerworld* that special care would be taken to see that no unescorted children would be allowed in.

The seminar program, 10 ses-

sions per day for the four days, will be held in various rooms in the center. No room schedule has been drawn up as yet, the DPMA said, but notices will be posted in the center and in the two hotels serving as convention headquarters, the Olympic Hotel and the Washington Plaza.

Special Arrangements

"With the Seattle Airport about 20 miles away," DPMA's Waters explained: "We've made arrangements to have a DPMA shuttle take the delegates into the city. The buses will run every 15 minutes." Also, DPMA has made arrangements with a total of 31 hotels to have 3000 rooms available for the convention.

Pacific Northwest Bell is making arrangements for the extra telephone communications lines needed by the conferences and the exhibitors. No special problems are expected.

The DPMA felt these scheduled tours to Seattle DP operations would be of interest to the visitor: Seattle First National Bank; Weyerhaeuser Co., the large lumber and timber concern; Pacific Northwest Bell; the Seattle Air Traffic Control Center; and Boeing, which includes a visit to a 747 mock-up.

The convention banquet will be held Thursday evening. D.H. Warnke, international president of the DPMA, will introduce the

head table.

Entertainment scheduled for after the banquet highlights Jean Fenn, Metropolitan opera star, and comedian Berl Williams. A

conference luncheon on Wednesday will provide the opportunity to DPMA's eastern members to see and taste a famous Seattle salmon bake.

Computer Opposes Bugs

ST. PAUL, Minn. — A computer is providing a time-saving swat in the seasonal battle here against mosquitoes.

The computer, a Univac 9300, isn't actually slapping the pesky summer insects, however.

But it is providing quick, easy access to a mass of information that assists crews from the Metropolitan Mosquito Control District (MMCD) in their work.

The MMCD includes six counties in and around Minneapolis and St. Paul. With 2,850 square miles, the MMCD is one of the largest mosquito control districts in the nation. Mosquito breeding sites cover 244,000 acres or 14% of the total land area in the district.

According to A.W. Buzicky, MMCD director, about 80 crews are involved in taking samples from 56,000 mosquito breeding sites in the district.

Buzicky said inspection crews estimate the number of mosquito larvae in samples taken from each breeding site. The samples are forwarded to the MMCD laboratory where various species of mosquitoes are identified.

This information is compiled on the computer, operated by the Ramsey County data processing department, and provides the MMCD with a master file listing the type and numbers of mosquitoes found at each site.

The type and kind of treatment are added to the site master file as the season progresses.

Crews continue site sampling they performed throughout the season. The reports are inserted into the master file to keep it updated. Last summer, crews performed more than 68,000 samplings.

The computerized master file quickly joins in the fight against mosquitoes when rain initiates growth of the larvae, Buzicky said.

"We can go to our master file and find out, for instance, which sites had a particular species of mosquito."

USER CONSULTANT DESIRES

Additional listings from software co's. We deal with many firms going, to or expanding EDP dept. We find systems for them. Would you like to be in our catalog as a possible source. Both packaged and custom work used. We are marketing nationwide. Send brief description of capabilities to

500 Newport Ctr. Dr.
Newport Beach
Calif. 92660

SOFTWARE MARKETING INC.

MNEMOTECH'S NEW AUTOMATED TAPE LIBRARY MANAGEMENT/MAINTENANCE SYSTEM PROVIDES DEMAND PRINTOUTS ON

retention
usage frequency
cleanings
recertification
availability
inventory
label changes
cost allocation

AUTOMATED PREVENTIVE MAINTENANCE REDUCES COSTLY DATA CHECKS, RERUNS AND TAPE REQUIREMENTS

MNEMOTECH
COMPUTER SYSTEMS INC.
55 LIBERTY STREET
NEW YORK, N.Y. 10005
212-267-8762

KEYPUNCHING Quality CAN BE Quicker!

Turnaround, and your job is back. Accuracy guaranteed. Proving quality can be quicker, with over 250 conscientious operators available. Prices exceptionally competitive. Call now for immediate quotation.

Phone: GEORGE SWITLYK
Philadelphia (215) WA 3-1930
New York City (212) 565-3374

Fimaco, inc.
230 W. Washington Sq.
Philadelphia, Pa. 19106

SUBSCRIPTION FULFILLMENT • SOFTWARE DEVELOPMENT (BOL) • SYSTEMS AND PROGRAMMING • RECORD AND BOOK CLUB SPECIALISTS • LIST MAINTENANCE

CAC'S Computerworld SALES Corner COMPUTERS

LOADED
1401-12K System
With 729 Tapes
And/or 1311 Disks

Economical
1440-8K System
With 1311 Disks

360-50 262K
CPU & 1052

1401-4 K System
All features

SPECIAL

519 w/27 Pos. M.S.
088 II Collator

Punched Card Equipment

We need:
557 I
047 w/keyboard

ALL EQUIPMENT UNDER M/A

WRITE
→ CALL • (404) 458-4425

Computer Acquisitions Company

P.O. BOX 29155
ATLANTA, GEORGIA 30329

POSTMASTER: CHANGE OF
ADDRESS FORM 3579 to be
sent to Computerworld Circulation
Dept., 797 Washington, New-
ton, Mass. 02160.

Summer Special LOWEST RATES EVER AT E.P.G.

CONFIGURATION

| | | | |
|--------|--|---|----------------------------------|
| 360/50 | — 512K | 2 | — High Speed Printers |
| 8 | — 9 Track tape drives | 1 | — 2540 Card/Read/Punch |
| 2 | — 7 Track tape drives | 1 | — 2501 Card Reader |
| 1 | — 2314 Direct Access Storage Device | 1 | — 2701 Communications Control |
| 4 | — 2311 Disk Drives | 1 | — 2780 Terminal |

OS-MVT, MFT-II, HASP,RJE

FREE OPERATORS TECHNICAL SUPPORT

ALSO: Systems / Programming 30 Keypunch Machines
360 Operations & Programming classes Sysgens Remote
Job entry capabilities

CALL:
TED SABARESE at (212) 826-0660
Vice-President

epg COMPUTER CENTERS
CORPORATION

345 Park Avenue, New York, New York 10022

Compare the IBM 360/20 with the NCR Century 100.

A benchmark study, recently performed by an independent consultant, compares the NCR Century 100 with the IBM 360/20 Models 2 and 4. This study points out that the NCR Century 100's total throughput is faster, more efficient. In fact, it indicates the NCR Century to be 23 per cent to 43 per cent more productive.

We believe our NCR Century 100 offers more performance per dollar than any system on the market. Its memory is in the 800-nanosecond range. Its dual disc unit stores more than 8.3 million characters and accesses data at an average of 43.7 ms. Monolithic integrated circuitry, more reliable than hybrid circuitry, is standard throughout the NCR Century system. Printing speeds range from 450 to 3,000 LPM. The NCR Century offers low-cost on-line capabilities if your needs demand this requirement.

The NCR Century 100 offers three lan-

guages: COBOL, FORTRAN, AND NEAT/3. It has an RPG Translator that easily converts 360/20 RPG source programs to NEAT/3. A full-scale operating system includes complete monitor control, a conditional job control language, a three-year operational calendar for job scheduling, continuous logging of computer operations—and more. And when you step up to the NCR Century, you gain full access to NCR's big library of applied systems.

For its capacity and throughput, we believe our NCR Century 100 is the lowest-priced computer in the industry. On the average, it's 30 per cent lower in cost than the 360/20 Model 2.

There's more to tell, of course. And we have a factual booklet that describes how much performance you could be getting with the NCR Century 100. For your free copy, write EDP Advertising, NCR, Dayton, Ohio 45409. Or talk to your NCR computer man.



THINK

Think again.

NCR
Computers

NCR is proud to be the sponsor of the Space Exploration Exhibit
in the United States Pavilion at Expo '70, Osaka, Japan.

Incorrect Tax Data Changes Leave Officials Puzzled

CW Midwest Bureau

GENEVA, Ill. — Errors attributed to faulty keypunching have affected the tax bills of 32,000 persons, put the Kane County Computer Center two and one-half months behind in its work, added several months to the session of the county board of review, and will cost those same taxpayers an unestimated sum to redo the tax cycle.

All the errors center around incorrect changes of owners of property after parcels are bought or sold. The mistakes were

found by the office of Frederick J. Spriet, supervisor of assessments.

Kane County Auditor Donald Clute, Spriet, and computer supervisor Donald Wauchope said values of the properties in question balanced out but that information on the 32,000 property holders for the assessor's books was incorrect.

That meant that, once the tax bills were mailed, owners would have received the wrong bill in many cases. "If I had let the books go back to the assessor," Spriet said, "there would have

been chaos."

Robert Stumm, chairman of the finance committee, said his committee was unable to discover the cause of the errors. Stumm said he couldn't imagine how the errors could have happened with the amount of checking that takes place.

When a deed is filed in the

recorder's office, it is checked by the county treasurer, checked again by the county clerk's office and then given to the computer center. A card is then punched and verified by a second worker before being entered into the computer program. Wauchope explained that the program was tested and

found to be correct.

"It was a keypunching error, in a way," Wauchope told *Computerworld*, but only about 3% was faulty keypunching. The remainder was that various departments were giving us faulty or incomplete information that got into the program."

RCA Unit Expands Services to All Users

(Continued from Page 1)

He predicted that, given a stable economy, the company would have coast-to-coast coverage by the end of 1971. He said that a New York office was already open, and that the next expansions were planned for Chicago and Los Angeles.

Basile said that essentially all non-RCA hardware on the market could be maintained by the RCA service group.

He also claimed that the new department would be able to compete on price and availability bases with other vendors. He noted that RCA presently has "one of the largest maintenance groups in the world."

The possible problem of obtaining parts could be solved in several ways, Basile suggested.

He said that parts could be inventoried, but that maintenance companies prefer not to make the sizeable investment needed to make this alternative work.

Other choices would be for RCA to buy directly, or to have the customer obtain the parts from the manufacturer. The latter would be preferable, Basile said, since a situation in which an OEM company bought parts from large manufacturers like IBM "may be touchy."

Facilities Management

Fred Myer, manager of systems, programming and computer support, will direct the new department.

Myer spoke of the government's interest in facilities management which, he said, is slightly different from what he expects of private industry.

The business sector, Myer said, has an interest in maintaining the position of top management, whereas the government "goes all the way" with facilities management. RCA's version of this DP management procedure might thus be slightly altered from the conventional, to encompass middle management

and below.

Future Reshuffling?

Various RCA sources speculated that this is the beginning of a reshuffling of computer service personnel.

One suggested that phase two would be a possible "merger" with the service department of RCA's Technical Products Division, which serves specific non-RCA-equipment contractors such as airlines.

In the distant future would be the combination with the parent company's computer support services department, so that the final structure would place all computer services under the same management.

Mag Card Selectric Gets Communications

(Continued from Page 1)

machines.

The MCS-2 provides interface

and control in serial 9-level, 7-bit format in IBM, BCD code. It is said to be compatible with IBM, Datel, and Dura "2741" BCD machines.

The MCS-3 provides interface and control in serial 8-bit Ascii code. The full 64-character code set is available. This model is speed- and code-compatible with Teletype Models 33, 35, and 37.

Address polling is available as an option. It provides addressing for multi-drop units on a single circuit consisting of three to six alphanumeric characters. Units can be addressed from a keyboard or remote computer. This option is compatible with the IBM 1050 Data Communications System, Western Telematic said.

A second option provides unattended operation. This provides for automatic answering in response to a called telephone number. The called unit responds with its ID and stored data. With this option, the con-

verter records and types incoming messages automatically.

The company said that the converter is installed by cable interposer without special tools.

The MCS-1 is priced at \$50/mo or \$2,250 purchase price. MCS-2 and MCS-3 models have lease prices of \$55/mo or \$2,475 on sale basis. The address polling option costs \$22/mo or \$792. Unattended operation will add \$13/mo or \$468.

With the exception of the address polling option which will be available during the fourth quarter of 1970, all items are currently available on a 10-week delivery schedule.

The IBM Mag Card Selectric Typewriter was first delivered in October, 1969. It is priced at \$175/mo. It can be purchased for \$7,875. The IBM 2741 terminal rents at \$82/mo.

Western Telematic, Inc. is at 5507 Peck Road.

Newcomer Programmers Find Few Jobs

(Continued from Page 1)

oration in both the scientific and commercial programmer fields. Where organizations such as McDonnell Douglas and Bank of America used to absorb all the trainees they could get, the door for trainees is now shut.

According to Ed Dickson of that office, "Employers now want two to three year's experience in Cobol and Bal and in addition they want experience on their specific model of computer."

"They tell us that they lose money due to the musical chairs situation in the industry. They no sooner get an employee trained than he changes jobs," he said.

Dickson added that he believes the IBM unbundling program which made education courses available only at a price is a factor in the freezeout of trainees.

"Employers now have to pay to have a trainee go through IBM's courses. There is tremendous resistance to entrants in the industry regardless of their level of education or trade schooling. It's a disgusting situation."

When asked the condition of the general programmer job market, Dickson said: "It's very, very bad. We've never had this situation before."

Too Many Applicants

The assistant chief analyst of the Bank of America in San Francisco, Richard Nugent, was asked why the bank had stopped hiring trainees. He said: "We are hiring on a more selective basis. We have many more qualified applicants than we can accept. It's not a question of our cutting

back on hiring. If anything, hiring is at a slightly higher rate, but we have never before had so many applicants to choose from — so we just hire the best."

The San Francisco Human Resources Department said that for experienced programmers the market is still good, but for trainees, "it's lousy."

San Francisco is affected by a tight economy, which the department spokesman said has put many companies on a austerity kick. "They are hiring much more selectively," he added and "will interview a

number of programmers, pick the best, and then offer him less than he was making or expects."

Dallas, least affected of all the areas, said that the situation has tightened in the last few months due to layoffs. "It is very, very difficult for programmers with less than a year's experience," said a department analyst. "There is a surplus of inexperienced programmers but not of experienced ones."

A Dallas employment survey released May 5 shows a shortage of computer operators.

Has Computerworld Called You?

Recently a number of our readers have reported receiving telephone calls from people who said they were calling for "Computerworld" and who asked detailed questions about personnel.

Computerworld staff members do call computer installations for information of various types — but not for detailed descriptions of job openings or for the names of employees.

These calls about personnel apparently are from personnel placement agencies seeking to trade on Computerworld's reputation. Computerworld has no association with any personnel agency and deplores the use of its name to gain information on personnel requirements and names of employees.

Any reader receiving such a questionable call is requested to ask for the caller's name, refuse to answer questions, and, if convenient, to report the incident to the Executive Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

TM Reg. U.S. Pat. Off.

Weekly newspaper — Second-class postage paid at Chicago, Ill. Published weekly (except: a single combined issue for the last week in December and first week in January) by Computerworld, Inc., 25 E. Chestnut St., Chicago, Ill. 60611. ©1970 by Computerworld, Inc.

Send all editorial and subscription material to: Computerworld, 797 Washington St., Newton, Mass. 02160. Telephone: (617) 332-5606. TWX: 710-335-6635.

Robert M. Patterson, Executive Editor. V.J. Farmer, News Editor. Neal Wilder, National Sales Manager. Margaret Phelan, Circulation Manager. Henry Fling, Art Services Supervisor.

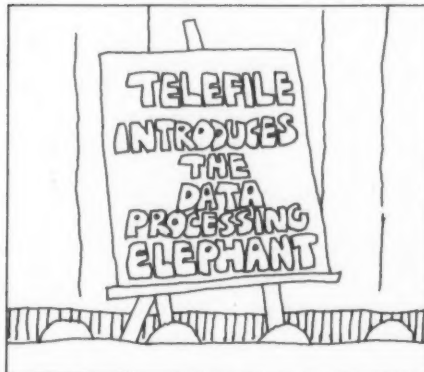
W. Walter Boyd, Publication Manager. Patrick J. McGovern, Publisher. Reproduction of material appearing in Computerworld is strictly forbidden without written permission. Send all requests for permission to the Publication Manager.

Subscription rates: \$9 for one year, \$20 for three years. Add \$1 per year for Canada; \$4.50 per year for other foreign. Foreign air mail rates available on request.

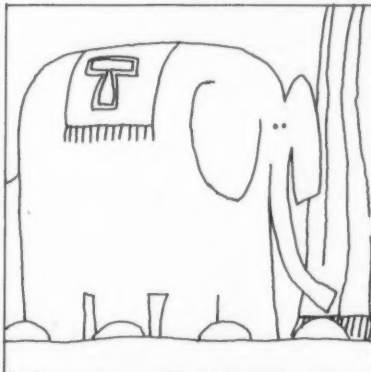
BPA membership applied for

POSTMASTER: Send Form 3579 (Change of Address) to: Computerworld Circulation Dept., 797 Washington St., Newton, Mass. 02160

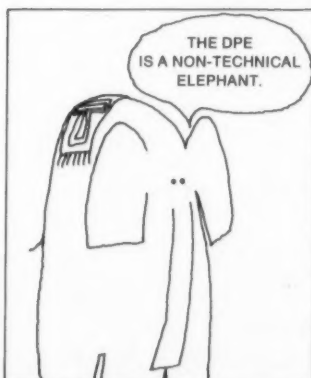
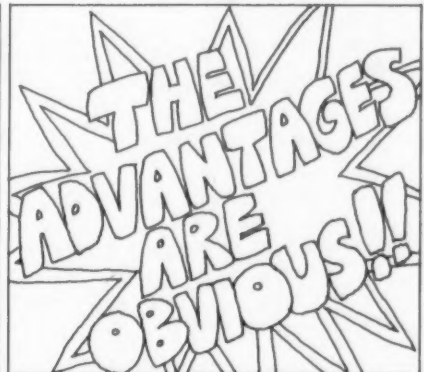
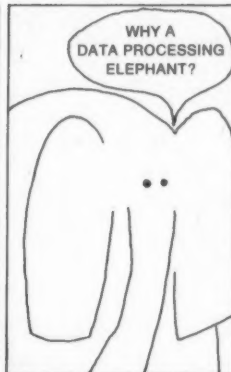
The Data Processing Elephant



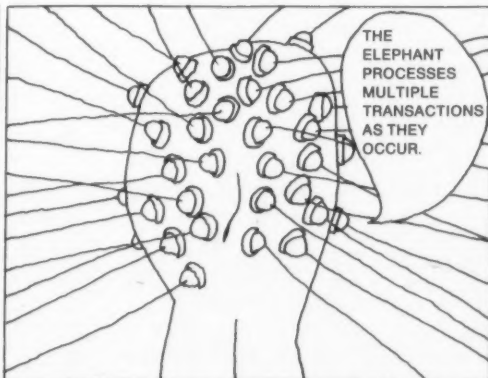
The Data Processing Elephant, or "DPE" as we call it, is a unique file management computer.



By itself the DPE can manage all your files or it can complement your present EDP system.



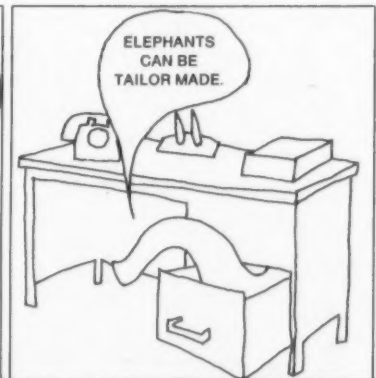
The DPE's language is a simple standard COBOL. The common business language. So you don't have to be a computer expert to use the DPE.



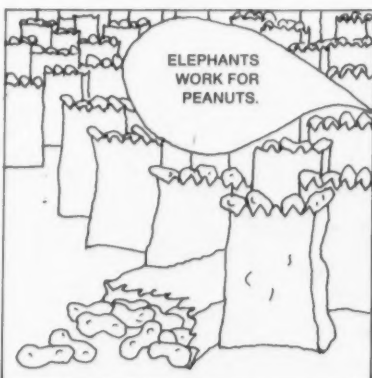
Telefile's DPE is the only on-line, real time, general purpose file management system.



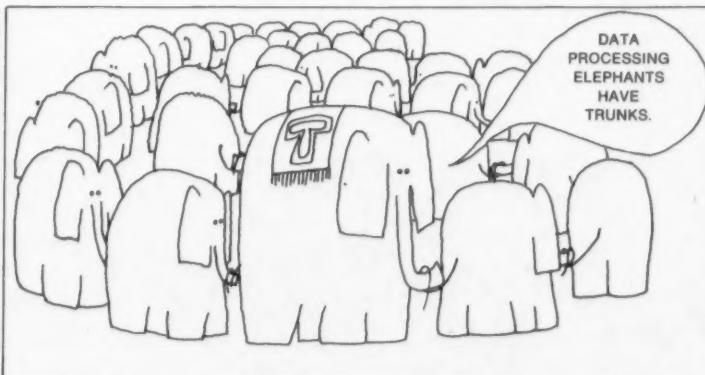
The DPE can lay its hands on any information you need right away. Because the DPE features random access and no sorting.



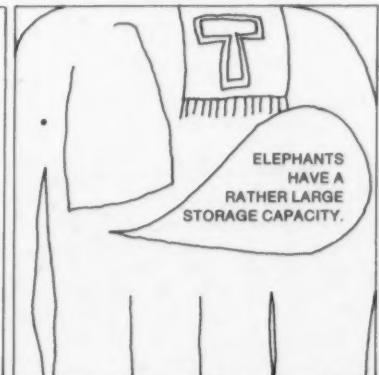
Telefile will help plan a DPE to fit your particular company's needs for data storage capacity and communication facilities.



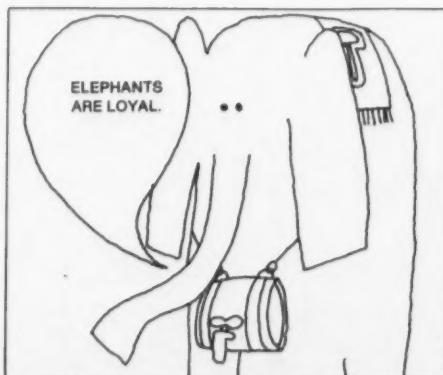
Many, many, many peanuts.



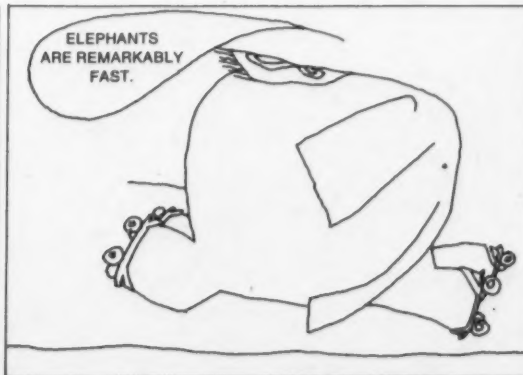
Up to 56 terminals can be linked to the DPE for a complete communications capability.



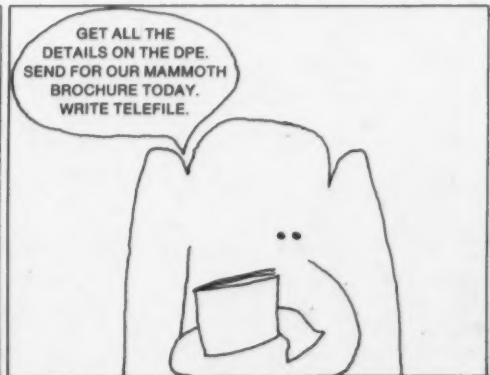
The DPE can store up to half a billion characters of information.



The DPE can be coded for security. Therefore nobody can get access to any part of the elephant's memory unless he's entitled to it.



You can retrieve any information from the DPE in a matter of seconds.



Telefile Computer Corporation
2000 Commonwealth Avenue
Auburndale, Mass. 02166

Telefile

WHEN ORDERING PARTS, PLEASE SPECIFY PART NUMBER, PART NAME AND INCLUDE
SIZE, CLASS, CODE AND SERIAL NUMBER STAMPED ON DATA PLATE.

MAIN BODY PARTS

| PART NO. | PART NAME | MATERIAL | REFERENCE NUMBERS | | |
|-------------|------------------------------------|-----------------|-------------------|-------|-------|
| | | | 02 | 03 | 04 |
| 39 | NUT | STEEL | 26582 | 26582 | 26582 |
| 40 | NUT | STEEL | 23194 | 23194 | 23194 |
| 41 | STUFFING BOX STUD | COLO ROLLED ST | 22950 | 22950 | 22950 |
| 42 | STUFFING BOX BOLT | STEEL | 44867 | 44867 | 44867 |
| 43 | CLAND | STAINLESS STEEL | 22948 | 22949 | 22949 |
| 44 | CAP SCREW | STEEL | 90080 | 90080 | 90080 |
| 45 | STEM PACKING SET COMPLETE | MOLDED RINGS | 23318 | 23319 | 23319 |
| 47 | NUT | STEEL | 36760 | 36760 | 36770 |
| 48 | BONNET BRONZE VALVE | CAST BRONZE | 28733 | 29509 | 29499 |
| 48 | BONNET IRON VALVE | CAST IRON | 28732 | 29508 | 29498 |
| 49 | BONNET GASKET | SHEET PACKING | 18527 | 49654 | 49655 |
| 50 | BOLT BRONZE VALVE | STEEL | 40210 | 44880 | 36530 |
| 50 | BOLT IRON VALVE | STEEL | 28945 | 33754 | 36530 |
| 51 | MAIN BODY SCREWED BRONZE VALVE | CAST BRONZE | 47071 | | |
| 51 | MAIN BODY SCREWED IRON VALVE | CAST IRON | 47070 | | |
| 51 | MAIN BODY FIG 125 LB IRON VALVE | CAST IRON | 47072 | 36864 | 36831 |
| 51 | MAIN BODY FIG 250 LB IRON VALVE | CAST IRON | 47073 | 36863 | 36830 |
| 51 | MAIN BODY 150 LB BRONZE VALVE | CAST BRONZE | 47074 | 42898 | 42900 |
| 51 | MAIN BODY FIG 300 LB BRONZE VALVE | CAST BRONZE | 47075 | 42899 | 42910 |
| 52 | BOTTOM CAP GASKET | SHEET PACKING | 18334 | | |
| 53 | CAP SCREW BOTTOM CAP | STEEL | 91300 | | |
| 53 | BOLT BOTTOM CAP | STEEL | | | |
| 53 | NUT BOTTOM CAP | STEEL | | | |
| 56 | INNER VALVE V-PORT | STAINLESS STEEL | 31242 | 37455 | 33374 |
| 56 | INNER VALVE QUICK OPENING | STAINLESS STEEL | 31243 | 37456 | 33357 |
| 57 | SEAT RING V-PORT AND QUICK OPENING | STAINLESS STEEL | 29859 | 31231 | 31232 |
| 58 | BOTTOM CAP 150 LB BRONZE VALVE | CAST BRONZE | 15744 | | |
| 58 | BOTTOM CAP 300 LB BRONZE VALVE | CAST BRONZE | 15744 | | |
| 58 | BOTTOM CAP 125 LB IRON VALVE | CAST IRON | 16343 | | |
| 58 | BOTTOM CAP 250 LB IRON VALVE | CAST IRON | 16343 | | |
| 59 | INNER VALVE GUIDE BUSHING | STAINLESS STEEL | 27042 | 27043 | 27043 |
| 56 | INNER VALVE V-PORT | STAINLESS STEEL | 35797 | 44262 | 44237 |
| 56 | INNER VALVE QUICK OPENING | STAINLESS STEEL | 40453 | 44263 | 44275 |
| 57 | SEAT RING V-PORT AND QUICK OPENING | STAINLESS STEEL | 35796 | 36523 | 35517 |
| 58 | BOTTOM CAP 150 LB BRONZE VALVE | CAST BRONZE | 15744 | | |
| 58 | BOTTOM CAP 300 LB BRONZE VALVE | CAST BRONZE | 15744 | | |
| 58 | BOTTOM CAP 125 LB IRON VALVE | CAST IRON | 16343 | | |
| 58 | BOTTOM CAP 250 LB IRON VALVE | CAST IRON | 16343 | | |
| 59 | INNER VALVE GUIDE BUSHING | STAINLESS STEEL | 27042 | 27043 | 27043 |
| 56 | INNER VALVE V-PORT | STAINLESS STEEL | 28999 | 32805 | 37811 |

PRINTED IN U.S.A.

8 1/2" x 11" page

your printouts.

MAIN BODY PARTS

When ordering parts, please specify part number, part name and include size, class, code and serial number stamped on data plate.

| Part No. | Part Name | Material | Reference Numbers | | |
|----------|------------------------------------|-------------------|-------------------|-------|-------|
| | | | No. 2 | No. 3 | No. 4 |
| 39 | Nut | Steel | 26582 | 26582 | 26582 |
| 40 | Nut | Steel | 23194 | 23194 | 23194 |
| 41 | Stuffing box stud | Cold rolled steel | 22950 | 22950 | 22950 |
| 42 | Stuffing box bolt | Steel | 44867 | 44867 | 44867 |
| 43 | Cland | Stainless Steel | 22948 | 22949 | 22949 |
| 44 | Cap screw | Steel | 90080 | 90080 | 90080 |
| 45 | Stem packing set complete | Molded rings | 23318 | 23319 | 23319 |
| 47 | Nut | Steel | 36760 | 36760 | 36770 |
| 48 | Bonnet bronze valve | Cast bronze | 28733 | 29509 | 29499 |
| 48 | Bonnet iron valve | Cast iron | 28732 | 29508 | 29498 |
| 49 | Bonnet gasket | Sheet packing | 18527 | 49654 | 49655 |
| 50 | Bolt bronze valve | Steel | 40210 | 44880 | 36530 |
| 50 | Bolt iron valve | Steel | 28945 | 33754 | 36530 |
| 51 | Main body screwed bronze valve | Cast bronze | 47071 | — | — |
| 51 | Main body screwed iron valve | Cast iron | 47070 | — | — |
| 51 | Main body fig 125 lb. iron valve | Cast iron | 47072 | 36864 | 36831 |
| 51 | Main body fig 250 lb. iron valve | Cast iron | 47073 | 36863 | 36830 |
| 51 | Main body 150 lb. bronze valve | Cast bronze | 47074 | 42898 | 42900 |
| 51 | Main body fig 300 lb. bronze valve | Cast bronze | 47075 | 42899 | 42910 |
| 52 | Bottom cap gasket | Sheet packing | 18334 | — | — |
| 53 | Cap screw bottom cap | Steel | 91300 | — | — |
| 53 | Bolt bottom cap | Steel | — | — | — |
| 53 | Nut bottom cap | Steel | — | — | — |
| 56 | Inner valve v-port | Stainless steel | 31242 | 37455 | 33374 |
| 56 | Inner valve quick opening | Stainless steel | 31243 | 37456 | 33357 |
| 57 | Seat ring v-port and quick opening | Stainless steel | 29859 | 31231 | 31232 |
| 58 | Bottom cap 150 lb. bronze valve | Cast bronze | 15744 | — | — |
| 58 | Bottom cap 300 lb. bronze valve | Cast bronze | 15744 | — | — |
| 58 | Bottom cap 125 lb. iron valve | Cast iron | 16343 | — | — |
| 58 | Bottom cap 250 lb. iron valve | Cast iron | 16343 | — | — |
| 59 | Inner valve guide bushing | Stainless steel | 27042 | 27043 | 27043 |
| 56 | Inner valve v-port | Stainless steel | 35797 | 44262 | 44237 |
| 56 | Inner valve quick opening | Stainless steel | 40463 | 44263 | 44275 |
| 57 | Seat ring v-port and quick opening | Stainless steel | 35796 | 36523 | 35517 |
| 58 | Bottom cap 150 lb. bronze valve | Cast bronze | 15744 | — | — |
| 58 | Bottom cap 300 lb. bronze valve | Cast bronze | 15744 | — | — |
| 58 | Bottom cap 125 lb. iron valve | Cast iron | 16343 | — | — |
| 58 | Bottom cap 250 lb. iron valve | Cast iron | 16343 | — | — |
| 59 | Inner valve guide bushing | Stainless steel | 27042 | 27043 | 27043 |
| 56 | Inner valve v-port | Stainless steel | 28999 | 32805 | 37811 |

Our printouts.

Computer printouts are amazing for the vast amount of information they provide, the incredible amount of eye-strain they cause and the unbelievable amount of money it costs to duplicate or publish their content.

What this country needs is a good off-line peripheral printer that produces typographic print — in legible, readable, formatted pages, ready for reproduction. In other words, printouts you can read — no matter how many you need.

Introducing the Photon 7700 Typographic Peripheral Printer. Introducing printouts in book-quality typography. Introducing formatted pages on phototypesetting films, papers or offset masters. Introducing,

therefore, tremendous savings in the duplication of your computer reports.

The Photon 7700 Printer is magnetic tape driven and comes with a basic software package. It holds and automatically mixes two sizes of two different typeface assortments. Each assortment consists of capital and lower case alphabets, numerics, punctuation and symbols. Average output speed is 300 lines per minute.

You can start saving time, saving money and saving your eyesight with this coupon.

Computer Graphics Division, Photon, Inc.,
Wilmington, Mass. 01887

PHOTON
WORLD LEADER IN PHOTOTYPESetting

Computer Graphics Division
Photon, Inc., Wilmington, Mass. 01887

☐ Please send me more information.
☐ I'd like a sales rep. to call.

Name

Title

Company

Address

City State Zip

Honeywell-GE — the Future for the User

Software Problems May Force Cobol, Fortran on User

By Don Leavitt
CW Staff Writer

As a result of the Honeywell-GE announcement, users faced with the choice of first language, or with the problem of

transferability to a new system, are almost forced into programming with one of the high-order languages: Cobol, for business, or Fortran, for scientific problems.

With an indefinite picture of what hardware will be available, a user would have difficulty in justifying much time and money for coding new applications in an assembler-type language that is tied to one machine or one family of central processors.

Similarly, formats and coding schemes for the report program generators available from the manufacturers are so radically different from one another as to make the RPG approach unprofitable.

Only in Cobol or Fortran does the user have a source program that can be compiled on various central processors, although

some coding changes, usually minor, may be required in shifting from one CPU to another.

Even the old idea that Cobol is "self-documenting," so often said disparagingly, can be a valid consideration for the user who may end up with a CPU different from the one which he originally planned.

The only basic problem he might encounter is that Cobol compilers often require more core storage than the assemblers do. This may not be a serious consideration, since most users have configurations that, for other purposes, include sufficient core for the newer Cobols.

Most of the GE and Honeywell machines now on the market support Cobol compilers of some sort. Usually based on Cobol-61 or Usasi Cobol, the versions differ in some of the elements not implemented, and in some extensions offered beyond the standard requirements. In most basic considerations, however, they can be considered compatible.

Fortran is perhaps not as widespread as Cobol, but compilers for the scientific language are supported on all but the GE-115 and the Honeywell 110, 120, and 125 systems.

Comparing the software support available, beyond specific languages, both GE and Honeywell provide tape operating systems for their entire lines. Likewise, disk operating systems are available for all but the Honeywell 400, 1400, 800, and the 1800.

Multiprogramming can be used on the GE 400 and 600 series, and on all of the Honeywell line except the 400 and 1400. Multiprocessing is not available on the GE 115 or 130, nor on the Honeywell 400, 1400, 800, and 1800.

FOR SALE
UNIVAC FASTRAN II
Mass Storage Drum and Controller
Immediate Sale
JOHN MILLER (412) 683-4220

**Hook up
with us for
a display.**

Computerworld's
Communications & Terminals Supplement
— July 1st Issue.
Closing: June 12th.

If you're an advertiser who wants direct input into the communications and terminals market, our *Communications & Terminals Supplement* will be of special interest to you.

The following are just a few of the subjects Computerworld will be featuring:

- Types of equipment available for communications.
- Terminals — remote batch, CRTs, typewriter, special purpose.
- Problems in installing and developing communications-based systems.
- Typical small communications user-needs and equipment trade-off.
- The regulatory process, tariffs and public utility commissions.

The Computerworld *Communications & Terminals Supplement* will reach our 35,000 paying subscribers, at more than 20,000 computer installations in the United States. These sites use 35,000 computer systems with a value of \$15 billion, accounting for over 75% of the total value of computer systems installed in the U.S.

Computerworld's circulation at these sites is concentrated on the Primary Buying Influence — the top systems executive. 18,500 of our subscribers are top systems executives — the end users.

To reserve your advertising space, hook up with the Computerworld representative nearest you. Your ad in our C&T Supplement will be well received.

National Sales Manager:
Neal Wilder
Sales Administrator:
Dorothy Travis
(617) 332-5606

New England:
Robert Ziegler
(617) 332-5606

Mid. Atlantic:
Donald E. Fagan
(212) 532-1790

Phila. — Wash., D.C.:
John Cummings
(212) 532-1790

Midwest:
Bill Farrell
(312) 944-5885

Eastern Midwest:
Joe Daniels
(312) 944-5885

Southeast:
Ed Graham
(214) 638-1140

Los Angeles:
Bob Byrne
(213) 657-6221

San Francisco:
Bill Healey
(415) 362-8547

ATTENTION DATA PROCESSING REPRESENTATIVES!!

- 1 — ARE YOU INTERESTED IN MARKETING HIGHLY CONSUMABLE PRODUCTS TO D.P. ENVIRONMENT WHICH AFFORDS GREAT REPEAT BUSINESS POTENTIAL?
- 2 — ARE YOU INTERESTED IN A RAPID AND GENEROUS COMMISSION COLLECTION PLAN?
- 3 — ARE YOU IN BUSINESS AT LEAST TWO YEARS?
- 4 — ASSUMING GOOD PRODUCTS, CAN YOU GUARANTEE A QUOTA FOR EXCLUSIVE TERRITORY?

IF YOU ANSWERED YES TO EACH OF THE ABOVE —
PLEASE CALL OR WRITE

D.P. SYSTEMS, INC.

342 Madison Avenue New York, New York 10017
ATT: HERBERT F. GREINER, VICE-PRESIDENT
(212) 687-2090

**Silence is golden.
Unless you're running
a time-sharing system.
Then it's red.**

Because in time-sharing, silence costs money. Money lost in poor use of machine capacity. Customers lost in the shuffle of poor service.

To really perform in time-sharing you need to build good rapport between hundreds of far-flung terminals and your processor. Rapport that isn't fitful or delicate, but constant and easy. And when it comes to building rapport, our backgrounds include the design and development of the best—with the biggest name in the industry.

Now, we've hung out our own shingle. We're in private practice, available to clients who operate time-sharing services businesses. And to manufacturers. And to large users. We diagnose time-sharing systems software, and prescribe improvements. We also design, develop, and implement it.

Is your time-sharing system a little pale, its muscles too weak for today's strong competition? Let us look it over.

Are you planning to market new hardware and do you want to equip it with the best in time-sharing software? Have us do a design sketch. Or the whole job.

Are you worried about an important on-line application, one which will have to incorporate expensive equipment, vital data bases, and demanding operational capabilities? Get our thoughts—and experience—on the software side of it.

If you need help with conversational computer software—about the toughest kind there is—give us a call. It's our specialty. Software Engineering Associates, Inc., 1749 Rockville Pike, Rockville, Md. 20852 (301) 881-1667.

**THE
SOFTWARE
builders**

Honeywell-GE — the Future for the User

H200 Series Should Be Dominant Part of Product Line

By Frank Piasta
CW Staff Writer

The current Honeywell 200 family of computers should be the dominant part of the product line that will emerge from the new company formed by the proposed Honeywell-GE merger.

It will probably be augmented by the GE 53, 55, and 58 small business systems at the lower end and by the GE 600 series at the top. The time-sharing computers in the GE 400 series, the 410, 430 and 440, can be seen as adding needed strength to Honeywell's offerings in this area.

In case of equipment similarities, Honeywell will probably prevail. This could result in the demise, at least in the U.S., of the GE 100 series. Although very successful, principally in Europe, it is not compatible with the 200 family and probably will not be allowed to survive. However, the next generation of systems currently under development at Honeywell might well have features similar to the 100s at the small end of the line.

The general-purpose GE 400s, the 405, 415, 425, and 435, compete directly with the 200 series. Most of this line has been around since 1964 and is becoming dated. Compatible within itself, the 400 line is word-oriented as opposed to the character orientation of the 200s. It, too, will probably be eliminated.

Time-Sharing Affinity

The acquisition of GE design talent by Honeywell should have a very noticeable effect on the next generation of hardware. The user will probably be offered a line of software- and hardware-compatible systems with a pronounced affinity toward time-sharing and communications.

The other area where the GE engineers' equipment will be important will be in the small systems area. Honeywell has recently begun an effort involving the use of minicomputers from its CCD division to enlarge the strength of the small computer end of its line. With the GE-Bull facilities and personnel available, Honeywell might leave this problem in the hands of its European engineers.

The user will probably emerge as the winner when the peripheral equipment of the two manufacturers is combined. In the areas of magnetic tapes and disks, Honeywell has enjoyed an enviable reputation. The Honeywell tape transport was the first to eliminate pinch rollers and so became known for treating tapes gently.

The Honeywell disk drives encompass a wide selection of capacities and use easily obtainable packs. The GE systems have to a much greater extent depended on fixed disk units. Although sometimes these offer faster access, and in others more storage on-line, they lack the storage flexibility of removable pack systems.

The punched card equipment produced by GE will probably be retained in the composite product line. It offers a range of speeds from 300 to 900 card/

min reading and 60 to 300 card/min punching. The Honeywell systems have in the past depended on OEM equipment for some of their card equipment. The availability of the GE line could reduce this dependency.

Although comprising fewer models, the GE printers offer a line that has a wider selection of speeds at a slightly better cost/performance ratio. The GE printers also enjoy a reputation rare among drum units — they can print a straight line.

In paper-tape equipment, Honeywell offerings seem to provide at least as good a price performance ratio, with overall performance roughly equal to that of the GE units. The Honeywell units will probably be retained.

OEM Suppliers

As in the area of card equipment, Honeywell has been using OEM suppliers for Mic equipment. GE, on the other hand, has a wealth of experience behind this type of reader, largely as a result of building systems dedicated to the banking industry. Again, Honeywell will be able to reduce its dependency on outside sources.

Honeywell will probably adopt the whole GE system of communications devices, from Datanet processors to the Datanet and Terminate terminals. These devices have been largely responsible for GE's success at building time-sharing systems and have no direct counterparts in the Honeywell line.

When the dust has settled and the product line has emerged, the user will be in a better position than he was before the merger. He will be able to choose from a much more unified and varied product line offered by a stronger, number two company.

Steel Data Bank Tells W. Germans Product Behavior

Special to Computerworld

DUSSELDORF, West Germany — A material data bank containing information on steels and steel products is being constructed in Dusseldorf, West Germany.

The object is to provide consumers with reliable information quickly on the behavior of specific kinds of steel under every possible condition; for example, at high and low temperature.

Consumers will be able to choose steels for given purposes and given stresses. The data bank is being set up by the Works Research Institute of the Union of German Iron Founders.

It indexes all the characteristic values typical of market steels in use by uniform features. The data is taken from current testing, especially at steelworks, and from the relevant literature. Apart from interrogation pure and simple to obtain data, materials experts can hold a dialogue with the computer, so that the stored information can also be used for complicated analyses.

| Model | Use | Min/Max (K Words) | Max Total No. of Characters | Cycle Time μ sec/Char | Av. Mo. Rental (\$K) | Year First Installed | Number of Installations |
|-------|---------|-------------------|-----------------------------|---------------------------|----------------------|----------------------|-------------------------|
| GE55 | Bus. | 5/10 | 10,000 | 7.9 | 1.4 | 66 | 1,300 |
| GE58 | Bus. | 5/10 | 10,000 | 1.2 | 1.5 | 69 | 100 |
| H110 | Bus. | 4/32 | 32,768 | 4.0 | 2.6 | 68 | 180 |
| H115 | Bus. | 16/32 | 32,768 | 2.75 | 3.7 | 70 | — |
| H120 | Bus. | 2/32 | 32,768 | 3.0 | 4.8 | 66 | 952 |
| H125 | Bus. | 4/32 | 32,768 | 2.5 | 7.1 | 67 | 335 |
| GE410 | T/S | 32 | 131,072 | 1.57 | 10.5 | 69 | 35 |
| | | | | | | | (includes 405s) |
| H200 | Bus. | 4/65 | 65,536 | 2.0 | 7.5 | 64 | 1,010 |
| H1200 | Bus. | 8/131 | 131,072 | 1.5 | 9.8 | 66 | 232 |
| H1250 | Bus. | 32/262 | 262,144 | 1.5 | 12 | 67 | 224 |
| GE430 | T/S | 32/131 | 524,288 | 1.05 | 16.7 | 69 | 145 |
| | | | | | | | (includes 425s) |
| GE440 | T/S | 64/131 | 524,288 | .88 | 23.8 | 69 | 39 |
| | | | | | | | (includes 435s) |
| H2200 | Bus. | 16/262 | 262,144 | 1.0 | 18.7 | 66 | 180 |
| H3200 | Bus/Sci | 131/524 | 524,288 | 0.5 | 22 | 70 | 4 |
| H4200 | Bus/Sci | 131/524 | 524,288 | 0.19 | 26.2 | 68 | 19 |
| H8200 | Bus/Sci | 32/131 | 1,048,576 | 0.09/0.19+ | 50 | 69 | 12 |
| GE615 | Bus/Sci | 65/262 | 1,572,864 | 0.32/0.50* | 47 | 69 | 18 |
| GE625 | Bus/Sci | 32/262 | 1,572,864 | 0.16/0.25* | 62.5 | 65 | 14 |
| GE635 | Bus/Sci | 32/262 | 1,572,864 | 0.08/0.125* | 79 | 65 | 85 |
| GE655 | Bus/Sci | 65/262 | 1,572,864 | 0.04/0.063* | 90 | 71 | — |

Computerworld 1970

+ 4- or 8-bit character * 6- or 9-bit character

Possible equipment line that could emerge from the Honeywell-GE unification.

INTERNATIONAL DATA CORPORATION

IS PLEASED TO ANNOUNCE THAT IT IS CURRENTLY CONDUCTING A MULTI-CLIENT STUDY ON

COM

Computer Related Micrographics Market

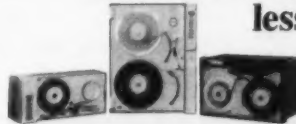


International Data Corporation
60 Austin Street
Newtonville, Massachusetts 02160

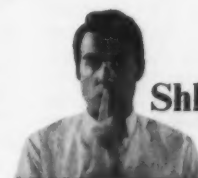
IDC is the largest market data gathering, research, and consulting firm in the computer industry.

Pssst... don't tell the big guys

But PEC's digital mag tape transports cost less than theirs. And work better.



A lot less. For only \$3000 in OEM quantities, you can buy a PEC 10 1/2 inch reel, NRZI synchronous transport, 7 or 9-track with speeds of 25, 18.75, or 12.5ips, and densities of 200, 556, or 800cpi. Or maybe your system needs 1600cpi. Just \$3740, in the same OEM quantities. And for less than \$2000 in quantities, you can buy a PEC 7 inch reel, NRZI transport. Compare that to the big guys' prices. And PEC transports work a lot better and are built to last longer. With simple and dependable features that give you data reliability. Year after year. For information, just write to Peripheral Equipment Corporation, 9600 Irondale Avenue, Chatsworth, California 91311 (213) 882-0030.



Shhhh...

PEC

Editorial

Security Revisited

The firebombing of the Fresno State College Computer Center [CW, May 27] reinforces what we said three weeks ago — DP centers should be treated as maximum security areas.

At Fresno, for instance, a few hundred dollars worth of bulletproof glass might have saved a \$500,000 computer and made it unnecessary to go through the agony of reconstruction.

Imagine for a moment the chaos that would follow a coordinated attack on major business DP centers in the U.S., especially since most of them are probably inadequately protected.



'How Would You Like to Be a Computer Operator?'

Letters to the Editor

The 'Age of the User' Dawns With User-Oriented Standards

To solve the problem you address in your April 8 editorial ("There Must Be a Better Way") in my opinion requires standards.

While I do agree with you that "standardization is (present tense) no answer," I believe standards for "higher level" languages hold the only adequate answer for this and a much larger class of problems (which they called "program transferability" at this year's SJCC).

The trouble lies with the scope of our present standards. We have succeeded in producing to date standards so one-sided that their chief importance seems to lie in that they are a beginning.

Except for I/O specs, today's standards speak paragraphs about what the programmer must put into his source code just to be acceptable to the compilers written for that language. On the other hand, today's standards say almost nothing about the *precise computational results* which in every case the object (load) code must return to the user at run-time.

Should any except assembly languages be hardware dependent?

Until we users can always count on run-time results from each source statement *regardless of hardware*, it would seem to me that source language translators of the sort you suggest will be too expensive to build and use. Once we get the proper standards, some of your suggestions will no longer be necessary.

Those concerned with programmer productivity (another article, same issue) might do well to consider the implications such improved standards would hold for measuring "what a programmer gives back at run-time."

The need for standards which adequately address this problem of *computational reversibility* is great. (Please note that I did not say *mathematical reversibility*.) The road there likely will be extremely difficult, since so many vested interests will seek to be served. Still in all, present day standards are a significant beginning. I believe they suggest a time when we would be able to perform any run-time operation a high level language permitted, then perform its inverse and *count on* what would be there regardless of the hardware. (Even though in the strictest mathematical sense we could not necessarily at this point have exactly that with which we started, with the assurance of the result we could code to complete the cycle.)

Perhaps right now (on the assumption that fourth generation hardware on the drawing boards is already beyond major modification) we should offer, to all potential manufacturers of fifth generation hardware, language standards incorporating compile-time-input to

run-time-output reversibility. Alas, we do not have these standards!

Is it too much to hope that by the time the fourth generation is aging, we could do what I propose with respect to sixth generation hardware? Might by then users just be bold enough to say also what a marketable operating system must and must not do?

Is it even reasonable to suggest to Brands W, X, Y, and Z and to the software houses that a real way to compete with Number One would be to make it easy to move *with certainty* among each other's products? (And such formal, user-supported standards should in no way involve restraint of trade.)

Can one reasonably look to a dawning of the "Age of the User" and the closing of the "Age of the Manufacturer" with all its generation gaps (known in the trade as conversions)? We surely won't see it if *users* don't try.

Wade A. Norton
Chairman

Birmingham Area Chapter
Assn. for Computing Machinery
Birmingham, Ala.

Need for Afips Professional Code Indicates Industry's Deterioration

Subject: EDP Code? [CW, May 13].

Shall we all hail Afips as the savior of the computer industry? It is certainly gratifying to learn that Richard I. Tanaka, as well as other members of Afips, have my professional reputation at heart.

The AMA of the computer field! At last I shall have a job description that is clearly defined. I question, though, who is amply qualified to categorize me or my position. Oops! I completely forgot about my proficiency examination given periodically to evaluate my abilities and job classification according to a universal scale. It will also be extremely interesting to learn who will be the leader of this elite organization. Perhaps, without too much fanfare, Tanaka would volunteer, at a modest salary of course. Maybe \$125,000 plus a few free complaints before the grievance committee.

Let us reason with this glorified idea in perspective. Has the industry become so deteriorated that a governing body is needed to control it?

Davis M. Flynn

Business Data Processing
Santa Barbara, Calif.

In a word, "yes." Ed.

Right Blend of Systems, and Business Knowledge Needed

Milton Spett's article in the May 13 issue posed some interesting questions:

1. Is there any correlation between EDP and business acumen?

2. There is a difference between experience and ability, but isn't true experience a strong contributing factor of ability?

3. Without experience, how can a person develop ability?

I agree that experience can be overrated. I also agree that there are some "outstanding systems (which) have been designed by analysts who had only slight exposure to computer systems."

However, it's very dangerous to assume that a person who has little business exposure and little computer exposure will have ability. This is the type of misconception that makes some of the users of our reports wonder why we're sending them out at all.

The answer is just the right blend of systems knowledge and business knowledge. This blend is very difficult to achieve, but any imbalance will cause difficulties.

H.B. Dawson
Manager, Data Systems

Union Steel Products Co.
Albion, Mich.

CTC Computer Corp.

Autodoc Developer

Your April 8 article in which the development of Autodoc, a CTC Computer Corp. proprietary program documentation package, was credited to Applied Cybernetics Corp. was in error.

CTC Computer Corp. has invested over five man-years of development effort in Autodoc. You can understand the consternation that the publication of this article created among the members of CTC's staff responsible for the product. Inquiries from confused customers and prospects were numerous.

L. P. Castro Jr.
Vice-President, Marketing

CTC Computer Corp.
Palo Alto, Calif.

Time for Consideration

Do You Know What Your Cobol's Overhead Cost Is?

How much overhead is involved when you run your Cobol programs? Do you think that they could run 5% faster if they were programmed differently — say in Assembly Language? Or perhaps 10% faster? Would you expect a run that currently takes an hour to drop by 10 minutes or so? Or perhaps you have not thought about it lately, having implicitly decided that it is not worth thinking about.

If so — if you think that the overhead involved in the use of Cobol as a programming language is practically negligible, get ready for a shock. Because figures are now appearing — for the first time — that show that far from being negligible, the actual cost is around 50%... or more. Not the 5% factor that can be swept under the rug.

But do not be too worried about your apparent error in judgment. You have plenty of company. Some years back, when the efficiency of assembly coding versus Cobol was a common subject of discussion, the Cobol protagonists argued that the object coding produced was about 90% to 95% as efficient as machine code; and the increasing use of Cobol appeared to confirm this, at least in the absence of hard figures showing anything else.

Now some hard figures are appearing to challenge this idea. They suggest that in practice the Cobol overhead is at least 10 times greater than that 5% figure — or over 50%! Randomly

selected Cobol programs from a number of different Cobol compilers and compiler versions are having their running times slashed in half. If the overhead was only 5%, then this would not be possible. It is possible — therefore, the overhead is well over 5%. How much over we still do not know, but 50% begins to seem to be a conservative figure.

The figures are coming from the results of the Honeywell Cobol Optimization Course

The Taylor Report

by Alan Taylor



which I reported on three months ago in "At Last — Results From Measurement" (Taylor Reports, March 25, 1970). When I originally checked into reports of seven-hour runs being cut down to under two-hour ones, the amount of experience was simply too small to draw any conclusions. However, since I wrote that article, experience

has been piling up and is becoming too great to ignore.

So far as I am concerned, the turning point came very recently while I sat in the back of a class where the course was being given to some of my own firm's clients. I knew — far better than Gerald Rosenkrantz, the instructor and course designer, — that these programs were randomly chosen. He had had no chance to preselect them. I knew, also, having looked at them, that they were quite standard types of Cobol programs — rather better quality than many I have seen — and did represent the field.

Yet as I watched, the pattern solidified, and the overhead that was contained in every one of the programs became apparent and accepted by the students as they started working on them.

While they were working on their programs, I was thinking; not about how to cut time down, but instead about the implications of the amount of time that was being wasted upon the Cobol Language itself. Because it was clear to me that in at least some cases it was the Cobol Language — not the compiler — where the root of the problems arose!

Perhaps the best simple example of the type of problem involved lies in the date field example. Almost every Cobol program has a date field. Some may have them only in the heading, where it may not be very important in terms of time; others, particularly in manufacturing, have a number of different date fields that are referenced within the central loop of every transaction. There it is difficult to find anything more important.

Dates are commonly broken down into three smaller fields — month, day, and year — which in Cobol are defined as being

elementary items within the date field itself. The date field is considered a group item. If a Cobol programmer wants to work with the full date — to move it, print it out, compare it with another date etc. — he just refers to the date field as a single name, and the compiler provides the object code that references the full field.

But... in the three compilers being considered, it does this by referencing each separate elementary field in turn. So it makes three times as many references as are necessary. This uses up extra execution time and also extra core to hold the instructions. But it is correct Cobol

Alan Taylor, consultant, writer, and former editor of *Computerworld*, is president of Computer Management Aids Corp. of Framingham, Mass.

compilation, because of the way the Cobol specifications say that the language is to be handled.

Put simply, it means that this usage of Cobol has put a 200% penalty on the user's machine time, and on his machine core. A 200% penalty is equivalent to a 67% wastage — a far cry from the 5% overhead figure that is generally believed.

The Data Division

Nor was this the only point that was made that was really based in the Cobol Language structure. Another was with regard to the quite horrendous costs of moving or adding fields which have been described differently in the data description. Moving an eight-character field into another eight-character field may be easy — but moving a three-character field with no decimal points into a five-character field with one decimal place can involve using up not 50% extra time and core, but more

like 300%!

The word that Gerry used to talk about this was "dissimilar" fields. But the examples he used of some of the very standard cases showed that the basic dissimilarity was more by definition than by real differences. There certainly is a very considerable difference between, for instance, '1' and '1.0'. Or between '01' and '1'. Indeed the same field '01.00' is even technically similar to all of these. At different times it can act in different ways. As far as its use is concerned, its description is variable as per the demands of the moment.

But this requires that these demands are seen. In Cobol they are normally not seen. The data division demands that each field is given a specific and unchanging description. And then it is effectively hidden away from the programmer while he is writing his procedures. Result — manifold inefficiencies. Cause again rooted in the Cobol Language!

New Implications

Now, none of these points about the Cobol Language are new. We have known of these characteristics of the language for years. But we have thought of them as being trivial. Even where single cases of 67% or more wastage were able to be documented, it was thought that it resulted, when averaged out, in only a small loss to the user. Now that the facts are coming in and the actual size of the loss in computer time is being documented, we can no longer afford to think this way.

Five percent can be ignored — but can you ignore 50% overheads?

I don't think so.

© Copyright 1970 Alan Taylor. Reproduction in whole or part forbidden. The views expressed in this column do not necessarily reflect those of *Computerworld*.

Letters to the Editor

A Tribute to Grosch

I have just learned that Dr. Herb Grosch has been removed from his position as director of the Center for Computer Sciences and Technology, National Bureau of Standards [CW, May 20].

We shall miss him and his insistence upon credible standards. When last heard from, Herb was deploring the egregious *de facto* assault upon data processing and Ascii code standards of IBM's System 3.

My first acquaintance with Herb dates from 1950, when he was a pioneering computer (computers were people in those days) of astronomical data by means of IBM electronic card calculators (calculators were the machines). He was an honest to goodness user of machines. No wonder his historic passionate devotion to believable documentation and standards. Standards are for the benefit of users.

It is a pity that only the large manufacturers have really caught on to this fact. It may explain why, for the past half-dozen years, they have quietly torpedoed meaningful progress in hardware and software standards. It is no secret that manufacturers have a greater interest in the marketing consequences of planned obsolescence and in holding customers captive than in standards which serve the long-term needs of users.

The world moves in cycles. Only a few of the pioneers in the computer profession may remember that our boy Herb was already fired twice before by IBM. That in itself takes some doing! But three times? As W.C. Fields might have said, "Any man who was fired three times by IBM can't be all bad!"

Ours is a troubled era.

Calvin N. Mooers

Rockford Research Institute Inc.
Cambridge, Mass.

For Lease
Teletype
Model 33ASR
with tape
perforator
and reader
from RCA

Available in quantity for
immediate delivery —
includes nationwide
maintenance service.

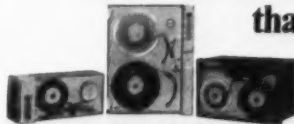
Just \$50 per month.

Call or write:
RCA Service Company
A Division of RCA
Technical Products Service
Bldg. 204-2, Camden, N.J. 08101
Phone (609) 963-8000
Ext. PY-4129

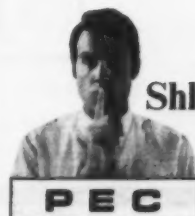
RCA

Pssst... don't tell the big guys

**But PEC makes more tape transport models
than both of them combined.**



Surprised? PEC makes over two hundred models in three reel sizes, 7, 8½, and 10½ inch. Choose from tape speeds and densities of 6.25 to 37.5ips at 200, 556, 800 or our new 1600cpi in synchronous versions. In 9-track or 7-track dual density with read-after-write, read/write, write only or read only. Formatted and unformatted. Or our incremental units with asynchronous rates of 0 to 1000 steps per second. PEC offers the industry's most complete line of tape transports. All available from our huge new plant. For more information, write to Peripheral Equipment Corporation, 9600 Irondale Avenue, Chatsworth, California 91311. (213) 882-0030.



Shhhh...

PEC

Viewpoint on Computer Services

Shakeout Can Benefit Service Companies and Users

By Ralph Zani

Special to Computerworld

One of the most significant continuing news stories today is about the shakeout within the service company segment of the computer industry. People who use computer services might well wonder how this shakeout could affect their service bureau, time-sharing service, remote batch networks, or whatever other service they use. If users have shopped wisely, they need not be concerned but, rather, can look upon these industry happenings as advantageous.

The process of agglomeration (companies merging, acquiring, dropping out) now taking place in the industry is, in many respects, similar to what has happened in other industries as they progressed towards a mature market state. The process in the computer service business has been incredibly more spectacular because things have happened so fast and on such a large scale. The industry has grown quickly, the potential is tremendous, and thousands of aspiring companies have plunged into the field. It is not surprising that a shakeout is occurring equally as fast.

Good for Users

As long as users have recognized the potential pitfalls and avoided them, they can feel secure with their computer service supplier. Many computer service companies will survive the current trauma and do very well in

the future. As a matter of fact, what is happening in the industry can be construed as good for the business and good, also, for users. The cost pressures will force service companies to operate more wisely and more efficiently. It will force them in the direction in which they should be going—towards increased specialization and greater reliance on generalized application packages.

Although the successful service companies of the future will more likely be large and stable, this does not mean that the day of the small independent service bureau has completely passed. The age will be difficult for many but it also will present certain opportunities. There will always be a need to provide services for the very small user: the manufacturing company with 50 employees, the hospital with 40 beds, the doctor, and the lawyer.

Increasingly the larger service companies will be less interested in providing services to the very small user. To the larger service company these accounts are only marginally profitable and may cost them money. The small independent can perhaps find a comfortable niche in providing services to the very small user.

What, then, are the characteristics of the computer service company that will be successful and that will assure users a good

and continuing source of services? Users should make sure that their supplier meets most, if not all, of the following criteria:

• **Competent Staff**—The people in the supplier organization, from the account representative to top management, should be computer knowledgeable and trustworthy. The shortage of good computer people is one of the main arguments for users to take the computer services alternative. Users should not compound their problems by turning to a company without the best personnel. A good organization makes all the difference in the world not only for good quality results but also for survival.

• **Adequate Resources**—The supplier should have the financial as well as the personnel resources necessary to enable him to continue to improve his systems and services and to develop additional systems and applications that will enable users to keep pace with advances in the industry. As computer technology changes, so does systems technology. And the latter will change at the more rapid pace in the near future. These changes will undoubtedly bring improvements to services, and users will want to take advantage of these.

• **High Degree of Specialization**—The more highly specialized a supplier is, the more comprehensive and solid is his service likely to be. Systems and services are becoming increasing-

ly complex. To provide good service and keep pace with new developments, it is important to specialize.

• **Generalized Application Packages**—A system already in existence and proven under actual operating conditions has significant advantages to users. Not only is the conversion burden eased but also day-to-day results are more likely to be better and more economical. Reliance on application packages has to spread. They are of considerable value to the service company as well as the user because they are one very good way of improving profitability and providing a competitive edge. These factors are important to users because they assure the supplier company will remain in business and make progress.

• **Data Communications Expertise**—Most service company systems of the future will involve data communications capability. For a service to be of maximum benefit to users, it will ultimately be necessary that the bulk of the information be sent to and received from the service center via terminal. The pickup and delivery problem which has been a drawback to service operations will eventually be solved. Current technology does not yet economically permit complete reliance on terminals for pickup and delivery, but the more experience a company gains with data transmission, the

sooner it will be likely to reach the ultimate communications goal.

There are several good examples of service companies that have most of the characteristics. Two notable examples are Medinet, GE's computer service component dedicated to hospitals, and Keydata, an independent service company concentrating on selected applications to specific industries. Although it took a long time for both to get going, they have begun to have a significant impact on their respective markets. Their current success in terms of increasingly favorable acceptance in the marketplace is a good indicator that their approach will become more widespread in the future. Many other service companies are already taking somewhat similar approaches.

Many of the factors that are causing the crisis in profitability are affecting users as well. In fact, the cost pressures on users—rising personnel, equipment, space and material costs—tend to strengthen the argument for greater reliance on computer service companies. If users are intelligently critical in their evaluation of data processing alternatives, they can do very well with any one of many computer service companies.

Ralph Zani is director of professional service, International Data Corp.

EDP- PROFESSIONALS

PROGRAMMERS

- SYSTEMS/PROGRAMMER — 60% SYS.-40% PROG. 10 to 14K
- ACCOUNTING SYSTEMS/PROGRAMMER, TOP FIRM to 15K
- BURROUGHS PROGRAMMER to 14K
- CONVERSION PROGRAMMER 1401 to 360 to 13K
- BTAM-QTAM SYSTEMS PROGRAMMER to 15K
- MFT-MVT SYSTEMS PROGRAMMER to 14K
- SR. 360/30-40 O.S. COBOL to 13K
- SMALL MACHINE PROGRAMMERS 9-15K
- JUNIOR PROGRAMMERS to 9K
- INTERMED. PROG./ANAL.—ASSEMBLY LANG. 14K
- LEAD PROGR. 360 DOS 14K
- PART TIME 360 PROG. & ANALYST \$
- MACHINE LANGUAGE SMALL COMP. 14K
- BANKING PROGRAMMERS—VARIED HARDWARE to 14K
- H-200, H-1250, H-120 TAPE MFG.—COMML. 12K
- NCR-CENTURY PEOPLE 10 to 15K

NO PROGRAMMER TRAINEE OPENINGS

SYSTEMS & MANAGEMENT

- EDP MARKETING REPS. 25K
- PROJECT LEADER OPPORTUNITY—sm. Group to 16K
- & med. size groups also
- SYSTEMS REPS—IBM—HONEYWELL 14K
- CONSULTANTS—COMMERCIAL MFG. 14-16K
- MANUFACTURING ANALYSTS 19K
- PEOPLE ORIENTED—SALES SUPPORT TYPES—EDP 13K
- TELEPROCESSING—SYS./ANAL. 14K
- OPERATIONS RESEACH ANALYST 16K
- SMALL MACHINE—SYS./PROG. 15K
- SYSTEMS MANAGER MFG. 18K
- JR. SYSTEMS ANALYSTS to 12K
- EDP SERVICE SALES REP. 12 to 20K
- SENIOR MFG. SYSTEMS ANALYST—EX. CO. 17K

The above are partial listings only.

We are a small professional firm staffed by experienced consultants only!

Call Nick Denaro, Collect, In Confidence 566-4325 Weekdays
or Mon. & Wed. Eves. till 8 P.M.

or send resume and we will phone you at home.

DENARO ASSOCIATES

87 Washington St., Brookline, Mass. 02146

"Ask Your Friends About Us"

"EDP Specialization Is Our Only Business"

Clients assume all fees

EDP Resumes Composed — Call For Appt.

Doctor-Computer Relationship Expected To Better Patient Diagnosis, Treatment

By Peter A. Carr
CW Staff Writer

SALT LAKE CITY, Utah — The computer-doctor relationship is one of the most powerful tools ever made available to a doctor, according to Dr. Homer R. Warner, head of the department of bioengineering at the University of Utah.

At the opening session of the San Diego Biomedical Symposium recently, Warner said that the computer and its developing interface with medicine will mean more work — not less — for the medical profession.

"The computer is not a threat, but a tool for the doctor," he said. "It is up to us to be imaginative enough to optimize its value."

"It is apparent that the computer not only provides a tool for assisting the doctor with the acquisition of data from his patient, but also, through the use of statistical methods, it can provide assistance in interpreting this information in the form of a diagnosis," he said.

"Much additional research is needed to make this approach sufficiently general to be useful over a broad spectrum of diseases, but it is now clear that with enough time and effort, this can be achieved," Warner said.

To illustrate the changes generated by the introduction of computers to the medical profession, Warner cited the process

of collecting information from and about a patient.

The patient may not see the doctor first at all, but may be referred to a health screening clinic where certain tests can be performed by non-professional personnel. The patient's vital statistics, such as height, weight, age, sex, can be collected by a receptionist, and entered into a computer-based patient record, he said.

A blood sample can be taken, analyzed automatically, and the results fed directly to a computer as parts of the patient's medical record. The results of electrocardiograms and lung tests can also be fed into the computer.

In addition, a self-administered patient history can be accomplished by having the patient answer a series of questions and the results placed on a single punched card, he said.

"This history, along with a report of the tests, is available to the doctor when he first sees his patient," Warner said.

"It is unreasonable to expect a doctor or nurse to digest vast amounts of data on patients," he said. "Therefore, the computer must play another important role, that of acting as a filter to screen out the irrelevant data and arrange the significant observations in a way that the nurse or doctor can get maximum insight into the patient's present condition and about direction

and rate of change in his condition when it occurs."

However, he said, this does not mean that the computer will dominate the medical field. There is still the matter of curing the patient, and this is an area that cannot very well be automated.

"Automation will relieve the doctor of many chores he now performs, primarily those involving data collection, report generation, logical manipulation, and communication," he said.

360/20, 2401-3 FOR SALE OR LEASE

IPS has for sale or lease and immediate delivery from its own inventory a 360/20 system and one 2401-3 tape drive. The 360/20 is a C1, 8K with 2203-A1 Printer, 2501-A1 Card Reader, and 2560-A1 MFCM. Price: \$62,500. The 2401-3 90KB drive is available for \$19,000 as a 7-track unit or \$22,500 as a 9-track unit. Both items also available for 2 - 5 year lease. Please call or write for additional information. Also write for our Bulletins listing other computer equipment for sale or lease.

IPS

(201) 871-4200

INFORMATION PROCESSING SYSTEMS, INC.

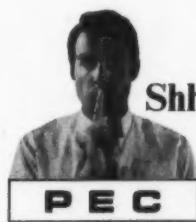
467 SYLVAN AVENUE, ENGLEWOOD CLIFFS, NEW JERSEY 07632
1307 Palo Alto Office Center Palo Alto, California (415) 328-4433

Pssst... don't tell the big guys

But PEC's got something they don't—delivery.



Buying a tape transport is easy. Getting "on time" delivery is something else. Impossible sometimes. To get your transports to you on time, PEC has a huge new plant producing tape transports, so you can get them when you need them. PEC makes over 200 models in three reel sizes. 9-track or 7-track, speeds from 6.25 to 37.5ips and densities from 200 to 1600cpi. In formatted or unformatted models. And you can get them fast, in OEM quantities and prices from PEC. For complete information on PEC transports, just write to Peripheral Equipment Corporation, 9600 Irondale Avenue, Chatsworth, California 91311 (213) 882-0030.



Shhhh...

PEC

Mass. Unit Backs Systems Bureau

BOSTON — The state legislature's administrative committee has reported favorably on a bill to create a permanent Bureau of Information Systems.

The bill was introduced by Administrator Donald Dwight after a report charging massive misuse and underuse of the state's three dozen computers [CW, April 1].

The report charged that millions of dollars had been wasted by the lack of cooperation among the state's offices and bureaus, many of which had submitted separate requests for computers.

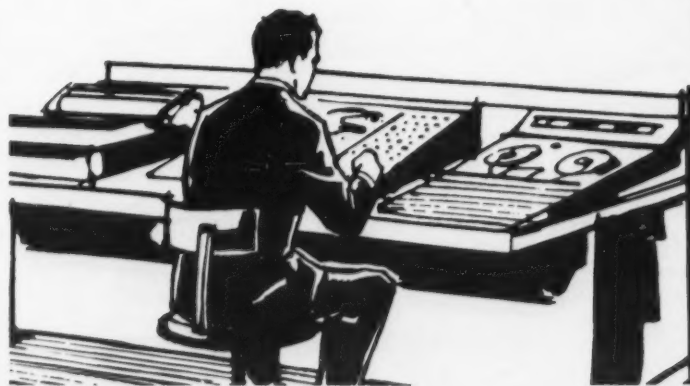
Alvin Kaltman, director of the state's Bureau of Systems Anal-

ysis, Data Processing, and Telecommunications, prepared the report, and said he is encouraged that the legislation to legalize his office will be successful.

Computer Services You Can Count On

To offer a full spectrum of computer services, it takes management and technical know-how. RCA Service Company has both... backed by more than 15 years' experience in programming, maintaining and operating data systems manufactured by the leading hardware firms. Look to RCA as a single source of comprehensive computer services for scientific and business applications.

Find out about computer services you can count on. The coupon will bring you full details with no obligation.



RCA

RCA Service Company

F-143

A Division of RCA
Attn: J. A. Basile
Bldg. 206-2
Camden, N.J. 08101

Please send details on RCA's computer services to:

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip Code _____
Telephone: _____

CUT COMPUTER COSTS IBM MODEL 25, 30, 40, 50 USERS

It is no longer necessary to struggle alone in EDP. You can now share a computer with other compatible users in your area. We will form this group for you, establish the Shared Service Center®, and then provide continuing management of the Center. The result—a lower cost to you. Unlike timesharing, this approach is intended for commercial applications. For further information write: President, The Silber System Inc., 430 East 56th Street, New York, New York 10022.

THE SILBER SYSTEM INC.

JFK Death Photos Computer—Analyzed for Conspiracy

By Drake Lundell

CW New York Bureau

NEW YORK — Computers are now being used to help analyze the "most photographed murder in history" — the assassination of President John F. Kennedy, according to Richard E. Sprague. Sprague, who is president of Personal Data Services of Hartdale, N.Y., contended in a press briefing here and in the May issue of *Computers and Automation* magazine that more than one assassin was involved in the killing and that a computerized analysis of the photographs will prove this theory.

Sprague has, as an avocation, studied the photographs of the assassination for the past six years manually and has just started the computerized analysis of over 300 still photographs

and over 25,000 frames of movie sequences.

Sprague claims that in spite of the Warren Commission Report on the assassination, "there was a conspiracy" to assassinate Kennedy. Lee Harvey Oswald, found to be the lone assassin by the Warren Commission, did play a role in the conspiracy, Sprague says, although "he did no shooting at President Kennedy."

There were, Sprague believes, at least three and probably four gunmen who fired a total of six shots at Kennedy, without any of the shots being fired from the location where the Warren Commission placed Oswald.

To use the computer's power in his investigation, Sprague plans to develop a coding sheet for each photograph and movie frame indicating where the pic-

ture was taken, when, what events are shown, and the people in the photo.

From this data base, he said, researchers will be able to cross reference all of the available photographs and determine the actions of certain people and the timing of the assassination events. They will also be able to determine which pictures show essentially the same events from different angles and perspectives.

"Another possibility," he stated in the *Computers and Automation* article, "which computer graphics make possible is image enhancement." For example, he said that several photos taken from different angles could be used by the computer to produce an image in three dimensions.

The objectives of the com-

puter-based analysis would be to answer the following questions, according to Sprague.

- Can rifles be seen in firing positions?
- Did any of the witnesses see a puff of smoke in the grassy knoll area. Is this shown on the photographs?
- Can the faces of the gunmen be seen?
- Do the photographs show

that shots came from the grassy knoll?

• Does the testimony of witnesses as to their actions agree with the actions shown by the photographs?

• Can separate gunmen be traced through the photographs?

• Given a certain object or event in a particular place, which photos show it during a particular time?

Federal Supply Schedule Lists 3 Software Firms

By Edward J. Bride

CW Staff Writer

WASHINGTON, D.C. — At least three software houses will have their wares listed on next year's Federal Supply Schedule, the list of government-channel procurement products which is compiled and published by the General Services Administration (GSA).

Another 10 have applied for membership into the schedule in attempts to bolster sales and obtain what amounts to government sanction of their products.

The packages to be listed are all general-purpose types and may find a limited market, since most government computers are procured with specific applications and capabilities in mind.

The only apparent criterion for listing is "stability and reliability of the company," one GSA source said, adding that the GSA had not been able to establish a product criterion acceptable to both users and vendors.

Agencies may still procure products through outside sources, but GSA's aim is to obtain these products at a cheaper price.

G. Whit Dodson, assistant commissioner for Automated Data Management Systems, said that all products involved are probably available on the commercial market.

One-of-a-Kind Products

The Federal Supply Schedule lists only one-of-a-kind products, Dodson said. When a product becomes more widely available, the specifications are written, then GSA competitively procures the item from one vendor and makes it available through government supply channels.

When specifications are written for certain software packages, then these, too, will be procured competitively.

Dodson said that at the moment, five-high disk packs are also listed, since government specifications have not been written. When they are, disk packs will also be procured competitively.

Dodson said that the National Bureau of Standards should, in the course of "normal evolution," develop both sets of standards.

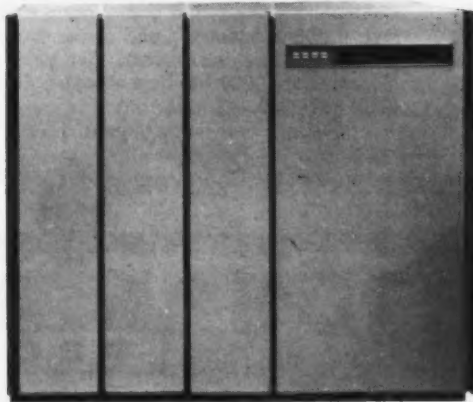
The three companies listing their products next year will be Pioneer Data Systems Inc., Information Management Inc. (IMI), and Applied Data Research (ADR).

Six companies are listing products during the current fiscal year, including IMI and ADR. The other four are Digitek Corp., Computation Planning Inc., Computer Efficiency Inc., and Applications Programming Inc.

Dodson would not say if these companies had applied for next year's schedule. Companies are approved on an individual basis, and can apply throughout the year.

Dodson said that some of the approved companies for the year ending June 30 had applied as late as last December or January. The 13 companies which have so far applied for listing represent an increase of about 50% over last year's applications.

ASTRODATA SJCC CONTEST WINNERS



Congratulations to John Sherman of Lockheed Corp., Sunnyvale, Calif. on winning the grand prize in Astrodata's "How much does it cost to Sort" contest at the recent SJCC. Jack's name was drawn from the nine daily winners whose estimate for a typical sorting problem was closest to the actual cost.

The Shermans will be guests of Astrodata and Princess Cruises for 15 days of leisure sailing along the coast of Mexico, South America and the Caribbean.



Princess Cruises' all first class S. S. Princess Carla C* sails the Caribbean and Mexican coast leaving from Los Angeles and Fort Lauderdale.

*Italian registry

Many thanks to all who entered. The nine problems and the correct answers will be supplied to anyone requesting them. Write to "Data Sorter" at the address below.

The nine daily winners who received clock radios were:

Tuesday, May 5

Thomas Kilkeny
Gerberly International
Philadelphia, Pa.

Robert Benjamin
Kraftco Corp.
New York City

John Sherman
Lockheed Corp.
Sunnyvale, Calif.

Wednesday, May 6

Mrs. Antoinette Stuart
NASA
Goddard Space Center
Greenbelt, Md.

Wallace Van Dyke
Consultant
Philadelphia, Pa.

R. W. Curtis
N.M.C.S.S.C.
Pentagon
Washington, D.C.

Thursday, May 7

C. J. Neilson
Consultant
Columbia, Conn.

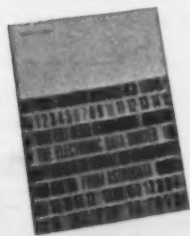
R. A. Wagner
Western Electric Co.
New York City

J. Froggatt

E. I. Du Pont de Nemours & Co. Inc.
Wilmington, Del.

THE REALLY BIG WINNERS WERE ALL THE ATTENDEES

at the SJCC who stopped at the Astrodata booth and heard about the capabilities of the Electronic Data Sorter. If you missed the Conference, write for your copy of the brochure "It Had to Happen," containing a comprehensive description of the Sorter and its application.



ASTRODATA INC., 240 E. Palais Rd., Anaheim, Calif. 92803; (714) 772-1000

Need a number-cruncher to solve complex problems? Quick?



**Call us.
ComputerPower is what we sell.**

Our number-crunchers can be lifesavers to you if you're drowning in complex problems. Just plug into the UCC Computer Utility Network through your own company, a UCC COPE, or other compatible system.

The UCC Computer Utility Network is a nationwide chain of UCC 1108's. You get fast turn-

around on big problems, and you pay only for the computing time you use.

Or perhaps your need for large-scale computing power has grown bigger than your present facility can handle. The Utility is the answer to this kind of prob-

lem. Almost any terminal at your site can access the UCC network on demand.

When you need a number-cruncher to solve complex problems — quick — call us. We'll give you the ComputerPower you need when you need it.

the total service Computer Utility company



UNIVERSITY COMPUTING COMPANY

1949 North Stemmons Freeway, Dallas, Texas 75207

Computer Utility Centers in: Boston, Chicago, Dallas, Denver, East Brunswick, N.J., Houston, Kansas City, Los Angeles, New Orleans, New York, Palo Alto and Tulsa.

We sell safety.

Graham tape is a means to an end.

We figured up how much a typical program costs to write. We looked at the cost of computer time. And we considered how much depends on an EDP operation's output.

Then we made the safest tape in the world — a tape that's good for a million passes, with no permanent errors.

We made a Zero Defects tape — one that generates no rub-off. We developed the exclusive Verituf binder system that makes this possible.

We made a tape this good because we figured your reputation deserves this kind of safety.

Some of the smartest men

in the EDP industry agree with us. That's why they're running Graham tape today.

How about you? Order a hundred reels of Graham, today. For safety's sake.

 **GRAHAM
MAGNETICS**
means to an end.



June 3, 1970

Page 17

Mixed Opinions**Survey Shows Basic Often Limits User's Flexibility**

By Elaine Bishop

Special to Computerworld

A number of computer users who have available the Basic programming language, in their own installations prefer to use other programming languages, a recent CW survey showed.

Basic, as developed at Dart-

mouth College, was definitely less popular than Fortran, according to five of the organizations polled. Two companies said that Basic was preferred, while a time-sharing service pointed out that its in-house programmers used Fortran while its customers mainly used Basic.

A sample of time-sharing users was too small and too service-dependent to draw conclusions about language popularity.

Comparisons of different versions of Basic are difficult. Six of the groups polled claimed that they had at some time made modifications to the version of

the language offered to them by the company supplying the computer system.

A spokesman for a time-sharing service offering an extended version of Basic said that the original Dartmouth Basic is old-fashioned now.

Use of Basic Decreased

Some organizations contacted said the use of Basic has decreased recently. One time-sharing service noted that initially 90% of its users programmed in Basic. The trend toward users in business applications rather than in education or engineering had decreased this percentage to 50.

An educator at a small college said that the curricula was changed to Fortran despite general satisfaction with Basic. Students found Fortran more applicable to post-graduate needs. A service bureau spokesman noted that economic pressure on the scientific community has caused a decline in interest in the language.

In contrast, a well-known business school teaches one-week courses in Basic for all its gradu-

ate students. Students write and run Basic programs in conjunction with their regular course assignments.

Basic is the acronym for Beginners All-Purpose Symbolic Instruction Code. The language was designed to be learned by persons who were not necessarily programmers.

A number of people polled cited ease of teaching and learning as a reason for the popularity of Basic in their installation. One user at a company that had been using time-sharing for three or four months suggested that although Basic was currently the predominant language, Fortran would probably be used for future engineering applications.

There seems to be conflicting views about the future of Basic. Two time-sharing services that are extending their language capabilities feel that Basic has a definite future in their services' offerings.

On the other hand, two users commented that the availability of matrix operations (a useful feature of Basic) in APL might some day bring about a switch to that language.

Condensed Files, On-Line User's Guide Offered with CP/67 System

By Don Leavitt

CW Staff Writer

NORWALK, Conn. — A series of enhancements for 360/67 CP/CMS, from Information Techniques, Inc. (IT), is said to provide users with:

- Condensation of files on the user's P-Disk.
- On-line reference to a User's Guide.
- Dynamic allocation of virtual machine size.
- Comma terminators for data fields.

According to IT, the File Condenser (Ficon) feature allows the user to make space available for reassemblies. In some cases, the company said, the space occupied by Fortran programs on the user's P-Disk has been reduced as much as 60%. Ficon also allows data files to be condensed and expanded, under program control, IT said.

The Auto Aid modification provides each user with a reference manual turned, in effect, to the page he needs, during a terminal session. According to IT, the user can interrupt his work at any time and, by issuing a HELP command and noting the area in which he needs help, have the desired material from the User's Guide displayed for him.

Machine Size

With dynamic allocation of virtual machine size, the company said, the user tailors the partition size to the needs of each program at Logon time. Without this enhancement, the developer said, the user was generally forced to use a partition that was too big for most of his programs.

The Allowance for Comma Terminators (ACT) feature is said to remove the restriction placed on the Fortran programmer to count and enter the correct number of blanks between fields when keying data from a remote terminal.

Two CMS commands that are incorporated into CP/CMS to make up Ficon are PACK and UNPK. Information Techniques said that the PACK command in effect expands usable P-Disk space by eliminating duplicate characters, including blanks, on stored data. The UNPK command reinstates packed data to

its original format.

According to IT, Ficon can be used with alpha, numeric and alphanumeric fields. The choice of records, and of fields within records to be packed is under program control, the developer said.

User's Guide

The provision for the on-line User's Guide, called Auto Aid, requires the user to follow the HELP command with the name of any CP/CMS topic on which he needs more information. As a third parameter, the user names an area within the topic.

Presently, IT said, there are five "area" options: Format provides the basic format for the topic named as Parameter 2; Programming applies to language topics; Modifications lists all in-house modifications made to the topic; Error Message provides a full expansion of a particular message; and Complete displays all information in the User's Guide on the topic. Other options are expected to be added later, IT said.

The developer said that Format is the default option on all applicable topics. In case of default where Format is not applicable, an error message will appear, according to the company.

IT said that each of the enhancements is available now. The Ficon feature is priced at \$2,800 and Auto Aid, \$3,500. Each of the other features, the ACT and the dynamic allocation of virtual machine size, costs \$800.

Information Techniques, Inc., is at 83 East Ave.

CBIS System Prints 'Personal' Letters With 360 25 Under DOS

WOODLAND HILLS, Calif. — Users of IBM 360 Models 25 and above can mass-produce personalized letters in upper and lower case with the letter writer system (LWS) available from CBIS Information Systems.

LWS is said to allow up to five

different inserts in a standard letter with full paragraph adjustment for varied inserts. The user can specify one or two-up production of the letters, and text-width variation can be controlled from the console. Conditional hyphenation of long words is

another feature, CBIS said.

Fully addressed envelopes to accompany the letters can also be produced by LWS, the company said.

The program that produces the letters can, under operator control, type the edited text on the console typewriter for proof-reading, prior to actual production on the printer, the company said.

Designed to be fast and small, the system is said to drive a 1403 printer, with the UCS feature and the SN text print chain, at maximum print speed. Because of the small size of each program in LWS, the developer said, a 64K 360/30 with three printers could be producing letters on all printers simultaneously.

A CBIS spokesman said that the system basically requires two "files"; one is the fixed letter text with keys to indicate paragraphing, location of salutation and inserts, and hyphenation. The other file contains the personalized information for each letter, including name and address, and text of inserts.

CBIS also said that two versions of LWS are available for use under DOS, to support either tape or disk files. Written in BAL, none of the LWS programs is said to require more than 12K of core.

On a sales agreement basis, the purchase price for the first installation site is \$1,100; each additional site is \$300.

CBIS Information Systems is at 6355 Topanga Canyon Blvd.

CDC Expands Linear Programming System

MINNEAPOLIS — The ability to handle linear programs three times as large as those performed by competing linear programming systems and to solve business problems three to six times faster than possible before, are the claims made for two large-scale mathematical programming systems from Control Data Corp. (CDC).

The systems, Ophelie II and Ophelie Mixed, were developed in France by SIA (Metra International), and have been implemented on CDC 6000 series central processors.

A linear programming subsystem, a matrix generator, and a report generator are the basic elements of Ophelie II. Each of these elements may be run independently or in combination.

CDC said that Ophelie Mixed is an expansion of Ophelie II that adds to the latter's features the ability to derive both pure and mixed integer solutions to problems such as forecasting capital investments. It is also said to be the first general purpose LP code to efficiently solve linear programming problems having a large number of continuous vari-

ables and integer variables.

Although CDC's Data Centers Division has been providing services using Ophelie II through the Cybernet time-sharing network for some time, this is the first time the systems have been made available to CDC 6000 users for in-house use.

On a paid-up license basis, the

cost of the programs will range between \$40,000 and \$75,000, the company said, depending on the system chosen, and the user's machine configuration. An alternate payment plan would require an initial fee of from \$5,000 to \$7,500, and monthly payments of from \$1,200 to \$2,200.

Language Conversion, Translation Added by CRC Computer Radix Corp.

NEW YORK — CRC Computer Radix Corp. has added computer language conversion and translation services to its line of software programs.

Conversion programs are now available with full translation capability of Basic to Fortran, Autocoder to Cobol, Autocoder to BAL, and Cobol to PL/1.

The Basic to Fortran program is offered both as a software package and as a real-time service, and operates on a 360 system with a 100K partition. Translation of the more commonly used Basic programs is 100%, according to CRC.

Other translation programs are offered as a service with all or part of a three-step sequence available to clients. CRC offers a feasibility study to evaluate potential success of conversion.

A second stage consists of a machine translation that accounts for around 85% translation and a third step provides a fully operational Cobol program.

Depending on the present status of the client's program, the charge could average out to \$500 per program.

CRC Computer Radix Corp. is at 101 Park Ave.

'Secure' Promises Tight Control of Flow of Securities

WALTHAM, Mass. — Brokerage houses that use the Secure system, an on-line accounting service, can expect very tight control of the flow of securities in their back offices, according to the developer, Data Architects Inc. (DAI).

Equally important, DAI said, is the control of the user's operating costs provided by the system.

The degree of control provided by Secure is possible because the system uses an integrated data base for all three phases of the operation: order trade; customer

and general ledger; and security accounting. An entry to the system in connection with any of these phases will affect all phases, DAI said.

Secure is also said to provide error detection controls so that invalid data cannot enter and contaminate the system. A transaction will not be accepted until all the required data fields have been entered in a permissible form, the company said. The entry process, DAI said, is interactive. The system provides an error message whenever the data presented is unacceptable.

A DAI spokesman said that he felt the security accounting phase of Secure is its most important asset. This phase ensures maximum compliance with regulations governing the status of the securities inventory. It also provides audit trails, reports of processing errors or anomalies, and reports and controls of securities loaned, borrowed or hypothecated.

The customer accounting phase is said to provide automatic margin calculation, as well as daily generation of segregation requirements for margin accounts.

Interest calculation and exception reporting of accounts which require manual attention are other features of the phase, DAI said.

The Secure service uses a mixture of common files such as broker name/address and security descriptions, and files peculiar to a single brokerage house. A built-in security system prevents unauthorized disclosure of information on the broker files, DAI said.

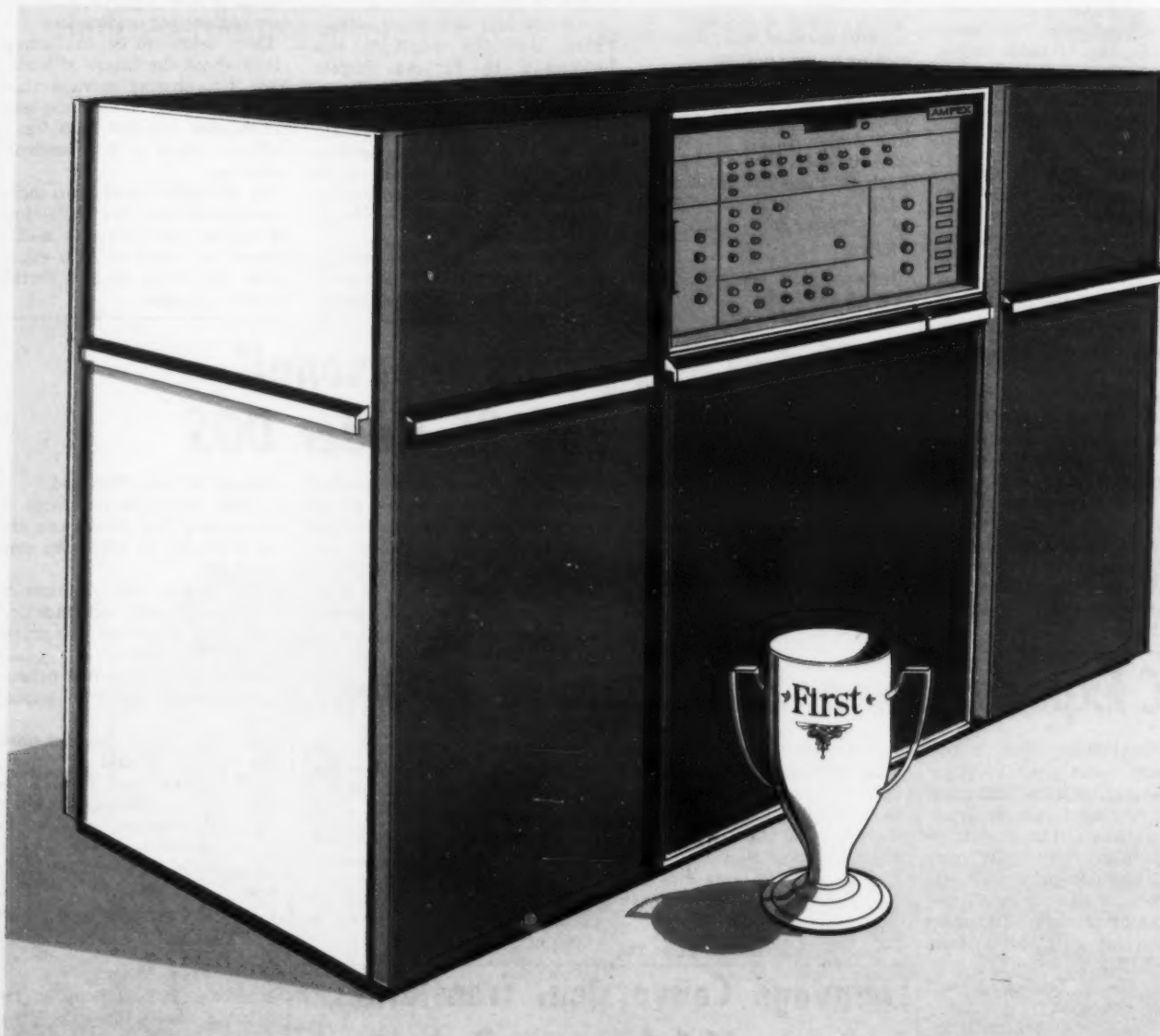
Functionally, Secure is based on an XDS Sigma 7 which can be accessed by the broker

through either teletypewriter or CRT terminals. DAI said that input from the terminal passes through a switching unit which sends a copy of the transaction to the appropriate personnel in addition to entering data into the system.

Expected to be operational in the fourth quarter of 1970, Secure will probably cost between \$1 and \$2.50/trade, the company said. Because of the unpredictability in market volume, DAI said, it hopes to avoid a monthly minimum charge.

Data Architects is at 213 Third Ave.

Speed merchant.



Ampex Extended Core Memory multiplies throughput on IBM 360's.

Plug in an Ampex ECM to a 360/50 and get almost twice the speed of a 2361 LCS. And even greater speed on a 360/65. Interleave two ECMs and effective throughput can be doubled again. It gives you more time to use for more data processing.

The Ampex ECM is a direct replacement for the IBM LCS. Just plug it in. Absolutely no modifications are required. Mechanically or electrically. And it is completely compatible with existing software.

And whether you lease or purchase, we'll give you complete service. All day, every day.

See for yourself. Ask for a complete list of operational sites.

For fast information, contact: Ampex Corporation, Computer Products Division, 9937 W. Jefferson Blvd., Culver City, California 90230, a leading world source for core memories, tape memories, cores, stacks and arrays. Telephone: (213) 836-5000.

Your computer counts on us.

AMPEX

'Help' Utility Program Handles 18 I/O Functions

CHICAGO — A utility program that handles up to 18 I/O operations is available from Seymore Data Processing Service, Inc.

Called Help, the program runs under DOS/360 Model 25 and up with BPS, and TOS. Help, written in BAL, requires at least 4,000 bytes of core, excluding I/O area.

The program can be kept on a resident disk pack or on cards. Help performs such functions as offset reproducing, gang-punching card-to-printer reformatting, tape-to-tape reformatting, card-to-printer reformatting, tape-to-printer reformatting, search and skip-tape records, and tape-to-tape blocking, reblocking and deblocking.

Help has a common routine that will reformat any data from any I/O area, a company spokesman said.

Help costs \$900.

Seymore also has a range of accounting services for the Chicago area. Included are general ledger, financial statements, payroll, production control, sales analysis, account receivable and billing, and inventory control and distribution.

Seymore does processing for its services on an IBM 360/30. The charge for the services is approximately \$22/hr. Contracts are also available.

Seymore Data Processing Service, Inc. is at 32 W. Randolph St.

@ K % *

Means something, but only the owner will ever know what.

Cipher/1 protects any type of confidential data from theft or unauthorized use.

\$495

A Mail Order Module for System/360

Cobol, Fortran, PL/1 Assembler, under OS or DOS/TOS

XANTHOS SOFTWARE INC.
281 Main Street
Wilmington, Mass.
(617) 657-7212

Concept and design



Gilbert F. Curtis

An honors graduate of Princeton, Gil Curtis is perhaps the industry's most skilled designer of generalized business software systems. Certainly Curtis-designed systems are operating very successfully in literally hundreds of major corporations throughout the U. S.

From this experience evolved the obvious need for a powerful report generator. One that would be easy to use, yet so powerful and fast it could be used as a report utility as well as for on-demand reports. In other words... CULPRIT.

Design and implementation

Anna Marie was literally a co-designer of CULPRIT and the major implementor. A skilled programmer, Anna Marie was able to perform basic CULPRIT functions in virtually I/O time, thus making CULPRIT unbelievably fast.

Anna Marie was at one time a member of the staff of Arthur D. Little, Inc., engaged in product development. Later, she spent a number of years in software design and development. Mrs. Thron holds a B.A. degree in chemistry from Beaver College, Pa.

Anna Marie Thron



Interface with data base language



James J. Baker

Jim Baker is an M.I.T. graduate (math major and honor society member) who has completed requirements for his Phd at Harvard.

Prior to joining Cullinane Corporation, Jim spent 5 years in advanced software system development at I.B.M. Therefore, Jim was the logical choice to develop the IMS/data language 1 interface module... which allowed CULPRIT to enhance the report generator capability of DL 1.

Jim was also a major contributor to the OS version of CULPRIT.

Documentation

An engineer with a B.S. in E.E. from Michigan State, Ken spent many years in electronics research and software review and evaluation before joining Cullinane Corporation.

He authors a monthly column on software for Modern Data magazine and knows exactly what the user looks for in terms of really effective documentation.

So when Ken wrote the user's manual for CULPRIT he put himself entirely in the user's position. Example: he devoted a major effort to a self-teaching section for junior level personnel... but at the same time included substantial material for the advanced CULPRIT user.

Kenneth Falor



Meet the people behind the most important software package of 1970: new CULPRIT.

Before many months are out the chances are you'll be using CULPRIT. Wherever it has been shown it has generated intense interest. The list of sales is growing quite rapidly. And it is the type of package literally everyone needs.

So we thought you'd like to meet a few of the more important people behind it. There are others. Perhaps a dozen Cullinane staff members had some part in CULPRIT. But these are the four who deserve the credit.

CULPRIT brought us a few surprises. Particularly in speed. While we designed it for flexibility and ease in use CULPRIT turned out to be much faster than our most optimistic estimates. Otherwise it performs exactly as planned.

And what we planned was an easy-to-use report generator and information retrieval system that would allow you to respond to on-demand report requests regardless of report complexity. One that was so efficient it could be used as the report utility in production systems.

How CULPRIT differs

Many report generators can produce only one report from one pass of the data file. Others produce a Cobol program which must be com-

plied, link edited and run before they produce a report. Some even have both problems. That's Model T designing!

CULPRIT is a parameter-driven program. No compiling needed. The program is kept on the core image library like a utility and produces a report as directed by the parameter coding. Highly efficient, it produces many reports (up to 99) with a single pass and can extract from multiple input files.

CULPRIT requires from 1/10 to 1/40 the normal coding time. This means that the most junior-level programmer can request and get a simple one-time report in minutes. Or many complex reports in one pass... with just a few hours of coding. Not weeks. Hours! But fast reports are not all that CULPRIT can do for you.

New Systems

When you design a new system, how much of it is made up of report editing programs? Half? A third? Then you can put your new system on the air nearly one-third to one-half sooner by simply plugging new CULPRIT into the system to handle the reporting requirements. You not only save programming time, but the machine time usually needed for debugging this part of the system.

Processing speeds are close to those for well-designed and laboriously hand-coded programs. Remember... this isn't an ordinary report generator. You just load and go.

Features

CULPRIT has multi-line output for address labels, notices, etc. Other options include header variables; multiple-lines in headers, detail and totals; separately specifiable total lines; calculation ability on both detail and total levels; use of mnemonics for working fields; and many others. Output may be printer, punched cards, tape or disk... permitting program and test file creation and conversion.

Find out for yourself!

Send for a complete 15 page technical report. Or, if you'd rather discuss CULPRIT directly with one of the above people (or equally well-qualified Cullinane staff members), pick up your phone and dial (617) 742-8656. You really ought to know about CULPRIT. Don't pass up the chance!

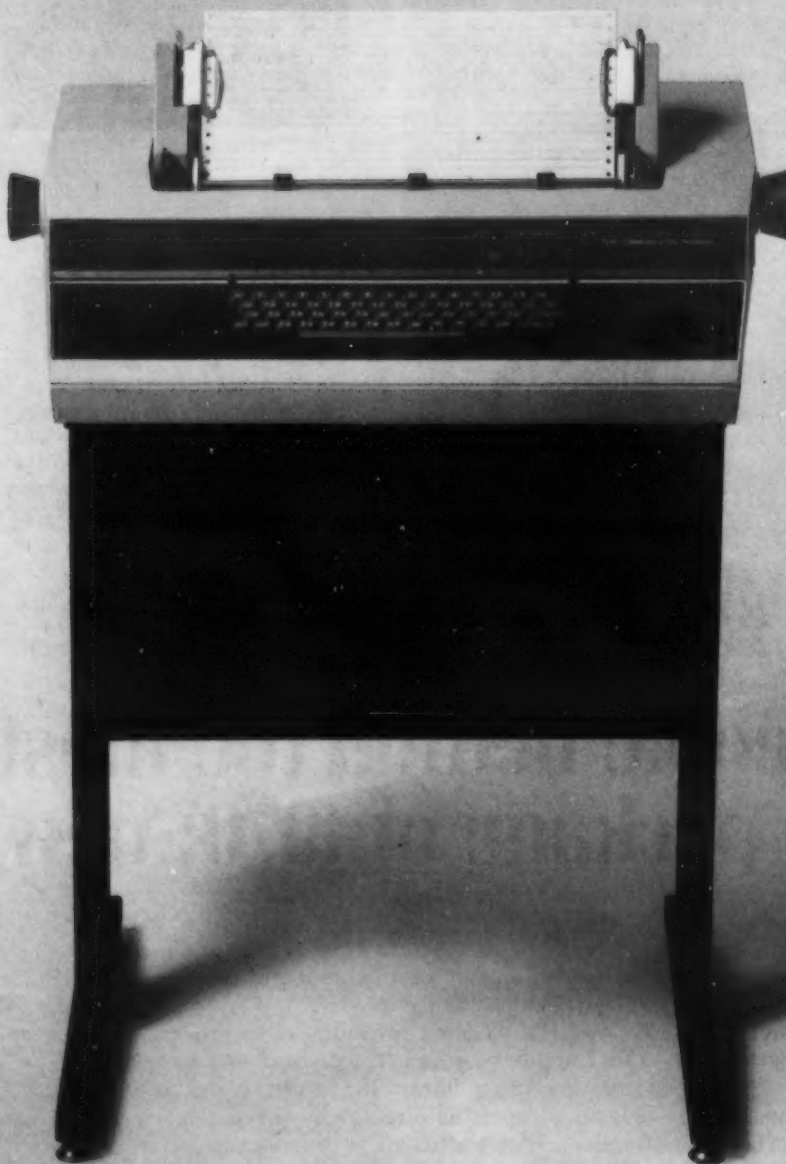


| |
|-----------------------------|
| Name..... |
| Title..... |
| Company..... |
| Address..... |
| City.....State.....Zip..... |
| Phone..... |



Cullinane Corporation

Memorex breaks the speed limit with the 60 CPS Communication Terminal.



The new Memorex 1240.

In commercial use and in time-sharing applications, it's everything you could ask for in a communication terminal.

There's a choice of 10, 15, 30, or 60 cps. With local or remote horizontal tab control.

An original and five copies are produced on paper as wide as 14 $\frac{1}{8}$ inches. And you get all 94 ASCII graphics on a 120 character writing line. The 1240 operates in full or half duplex with Memorex integral modems.

Just as important, the 1240 is easy for people to get along with. It's quiet, even while operating at 60 cps. The operator has maximum print visibility. Print cartridges are completely interchangeable. Paper loading is easy.

The 30 cps model starts at \$115 (the 60 cps is \$140 per month). And you'll be getting more effective, more reliable communication per dollar than with any other terminal you can buy.

For more information, write:
Memorex/Equipment Group, San Tomas
at Central Expressway, Santa Clara,
California 95052.

MEMOREX

Bell Postpones Private Line Interconnection Plans

By Ronald A. Frank

CW Technical News Editor

WASHINGTON, D.C. — Computer data users who wish to interconnect non-Bell terminals with voice grade private lines will not be required to comply with telephone company interconnecting arrangements until July of 1971.

Bell originally had set July of this year as the date that its private line interconnecting arrangements would become ef-

fective. The postponement means that data users can continue, at least for another year, to connect non-Bell data equipment to private line communications systems so long as "minimum protection criteria" set by AT&T are met.

The postponement was made known in an AT&T tariff filing presented to the FCC last week. The tariff will become effective next year, barring any contrary action by the commission.

AT&T said the one-year postponement was requested because, "it has become impractical to implement the connecting arrangements for connection

Communications

of customer-provided equipment and systems by July 1, 1970, on all existing voice grade private lines."

The AT&T filing did specify, however, that existing require-

ments for "network control signalling and minimum protection criteria will continue to apply."

A similar situation existed previously for data users with non-Bell equipment that used the dial-up telephone network. In this case AT&T developed a Data Access Arrangement (DAA) device to be connected between the user's equipment and the telephone line.

Whether AT&T will develop a DAA-type device for voice grade private line users is not clear. An FCC spokesman told CW that the new tariff filed with the commission did not specify what the interconnection standards would be.

However, an AT&T spokesman told CW that Bell is now evaluating the possibility of tariffing a DAA-type device for use on

voice-grade private lines. Presumably the one year postponement would give Bell Labs ample time to develop such a unit.

The Bell filing said that protection to the telephone line "cannot be achieved without modification of customer-provided equipment."

AT&T has continually taken the position that non-Bell equipment can be interconnected with Bell lines only when adequate safeguards are provided. At present, voice grade private line users can directly connect non-Bell equipment so long as no harm to the system results.

The Bell service offerings included in the one-year postponement are 2000 series, 3000 series, 4000 series private line; 5000 Telpak; and 8000 and 11,000 wideband.

Great Need for Specialized Services Cited

HOUSTON — Telephone companies have in the past been relatively free to decide how best to meet the requirements of computer data users. This situation is rapidly changing, however, according to Bernard Strassburg, chief of the FCC's common carrier bureau.

Speaking before the annual conference of the International Communications Association (ICA), Strassburg said that previously "the highly standardized and inflexible nature of the communications services offered imposed a cost upon consumers — the cost of adjusting specific demands to general service offerings" available from the telephone companies.

Strassburg said that "the cost to consumers of adjusting... to existing service offerings is becoming an increasingly important factor in their total communications budget. They are therefore constrained to look to the potential economies of specialized service offerings which are becoming available as a counterthrust to the economies of standardized larger scale operations."

Mushrooming Demand

"One of the most significant changes in consumer demand for data services" has evolved from developments in the computer industry and the mushrooming demand for specialized communications services," Strassburg told ICA members.

He said: "The explosion in the demand for data communications provides us with a perfect example of the interaction of changing demand and technology. The new demands have ignited the interest of entrepreneurs who propose to adapt an old technology, radio microwave, to the characteristics of data communications and by so doing develop new markets by offering differentiated services tailored to the needs of data users."

Speaking of the capabilities of existing telephone facilities, Strassburg said: "Carriers are now faced with the need to modify their existing systems to handle both voice and data communications efficiently and economically. This presents a difficult and complex challenge to the existing carriers because of the need simultaneously to modify their multibillion dollar plant in service while at the same time adding several billions of dollars of new plant annually just to meet growing requirements for their conventional users."

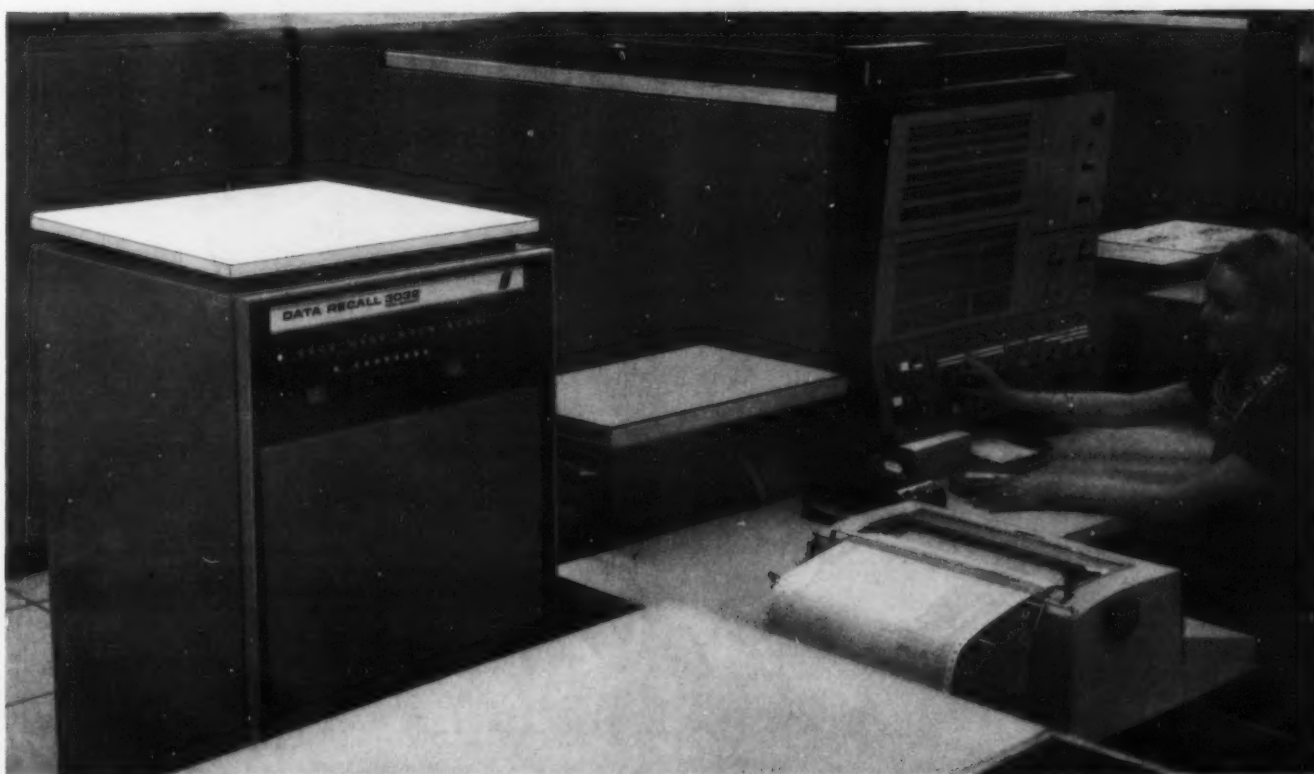
"A [telephone] communications network oriented to satis-

fying the needs of the public for person-to-person voice communication is being subjected to the pressures and challenges of meeting a wide range of data

communications requirements," he said.

Strassburg said the FCC would welcome comments from data users about the carriers' services.

360 Users! Upgrading Your 30, 40 or 50?



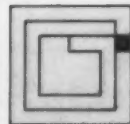
You Now Have an Alternative... Core Memory Upgrades from Data Recall.

- Complete Compatibility
- Installed Since January
- Delivery Now
- Low Cost LEASE or Purchase
- Interchangeable Between Models
- All Standard Increments (includes 2us Mod 30 to 65K)

For additional information please call or write to:

COMPUTER INVESTORS GROUP, INC.
WORLD-WIDE MARKETING REPRESENTATIVES
Symphonette Square • Larchmont, New York 10538
(914) 834-7700

Other Offices in: Toronto, London, Paris, Frankfurt





Picky processor?

CPU's get mighty picky on a paltry diet of proverbial punched cards.

That's why Inforex developed Intelligent Key Entry.TM

Inforex feeds hungry CPU's. It does electronically what other forms of data entry do mechanically.

The Inforex system gathers data from eight keyboards into one disc memory unit. Data may be sight or key verified. Built-in logic performs check digits, left-zeros and balance totalling. Jobs are pooled onto 7 or 9-track compatible tape. Optionally, it will operate on-line directly to your central processor.

Keypunch/verifier functions.

Starting with the familiar 64-character keyboard, each Inforex keystation performs all keypunch and verifier functions: Automatic check-digit computation. Automatic left zeros. No digit by digit keying is necessary. Electronic skipping and duplicating rather than mechanical. Auxiliary duplication or two additional levels of program control. Automatic + or - signing of fields.

Simultaneous entry and verification.

All eight keystations input to one disc memory unit. Each keystation is assigned an area as it enters. Any keystation can access any assigned area at any time.

Since each keystation has both sight and key verification capability, one keystation can verify work entered on another and if desired, verification can be done simultaneously with data entry.

Keyboard to tape functions.

Inforex automatically pools input from up to eight keystations onto 7 or 9-track compatible tape. One easily entered statement transfers a series of batches. Only one keystation is required to initiate the transfer, and all keystations are functional during transfer. There are no cartridges to handle or identify, no special equipment needed for pooling.

Recallable programs.

Each program has four levels of control. Once the program is keyed, it can be stored for future use and recalled by any operator merely by keying its appropriate program name. Up to 128 different program controls can be stored. There's no program card or tape mounting and no repetitive program control keying.

Self-balancing. Zero balancing is an integral part of the Inforex system. Each operator may accumulate a control total during data entry. Edit controls allow rapid correction. Adjustments to

the balance total occur automatically during verification.

125-character records. With Inforex Intelligent Key Entry, the record length is variable up to 125 characters.

Full record display. For added accuracy, each keystation displays an entire 125-character record with moving cursor and position counter. The system has a forms capability that allows data entry and verification in a "fill-in-the-blank" fashion. Operator messages for direct interaction with the system along with search and paging of a file are standard.

Attractive office decor. Inforex design innovation doesn't stop with the components. Each Inforex keystation is built into an attractive contemporary walnut and black steel desk designed for operator ease and comfort. And remember, the system is electronic, not mechanical, allowing a quiet, comfortable atmosphere to work in.

Inforex monthly rental cost is \$50 per keystation. \$560 for control unit (up to 8 keystations). \$960 for a complete 8 keystation system, including maintenance.

Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803 or, Inforex AG, Dornacherstrasse 210, Basel, Switzerland.

"Inforex it"

New Literature

American Science Associates has released a new 12-page brochure entitled "A Guide to Venture Capital Financing" by Carl W. Stursberg Jr.

The publication was prepared to assist new and aspiring entrepreneurs in their efforts to raise capital and finance their new ventures. It is available without cost from American Science Associates, 1345 Avenue of the Americas, New York, N.Y. 10019.

"How to Make Measurements Automatically," a basic exposition of digital data acquisition systems, explains how they can automatically measure temperature, pressure, force, strain, and other physical parameters.

The Vidar Brochure provides a detailed system description and lists the considerations involved in selecting the components of an automatic-measurement system. Copies of the brochure, Vidar

Bulletin 120B, are available on request to Vidar Corp., 77 Ortega Ave., Mountain View, Calif. 94040.

The P-2000 fundamental executive, P-2000 programmer's console program and the P-2000 formatter for use with the Prodac 2000 series computing control systems are described in three illustrated bulletins. (The P-2000 is a minicomputer.)

The 16-page bulletin on the fundamental executive describes in detail the software system of the P-2000. The four-page bulletin on the P-2000 programmer's console program describes operation of minimum and basic programmer's console configurations. The P-2000 formatter is a set of software routines in the P-2000 Fortran library.

For copies of DB-23-203, DB-23-205, and DB-23-252 from the Hagan/Computer Systems Division, write: Westing-

house Electric Corp., P.O. Box 868, Pittsburgh, Pa. 15230.

Computer System Architects Inc. has announced the availability of a brochure describing its consulting services for developers of computer-related products. The brochure contains an introductory portion, plus sections on nature of services, business methods, and corporate make-up. In addition, a CSA staff-experience profile is presented which treats project-oriented staff accomplishments as related to specific CSA services.

A new eight-page brochure is available from Data Management Services Inc., which describes the functions of the company's Implementation Division. The illustrated brochure describes in detail the major types of services, the classification of personnel, and the manner of operation of the Implementation Division,

which is responsible for the design, installation, and programming of information systems for computer users. Write: Implementation Division Brochure, Data Management Services, Inc., 31 Lewis St., Hartford, Conn. 06103.

The latest issue of the Redcor Conversion Module short form catalog is now available. The catalog contains updated specifications on all of Redcor's user-oriented conversion modules. This line includes the spread of individual circuits needed to construct a wide variety of multiplexers, analog-to-digital converters, DACs, simultaneous sample and holds, data distributors, and other data handling functions similar to this class of products. The catalog is available from Redcor Corp., 21200 Victory Blvd., P.O. Box 1100, Woodland Hills, Calif. 91364.

A new specification sheet is available on the Daedalus Model 119 tape unit and controller. Included are descriptions of the IBM-compatible unit's manual controls and indicators, the controller, and error conditions recognized by the controller.

For a copy of the Model 110 specifications sheet, contact Daedalus Computer Products, Inc., P.O. Box 248, North Syracuse, N.Y. 13212.

Spectron Corp. is issuing an illustrated two-color bulletin that details the operations and advantages of its new universal data communications monitor. The bulletin shows that the monitor provides a hard copy record of every character that appears on the data link, monitors all communication codes and speeds up to 7,200 bit/sec, and accommodates all line-coordination systems. It operates with either synchronous or start-stop transmissions, and synchronizes automatically even on multidrop circuits.

Requests for copies of the bulletin will be fulfilled promptly by Spectron Corp., 1060 Kings Highway North, Cherry Hill, N.J. 08034.

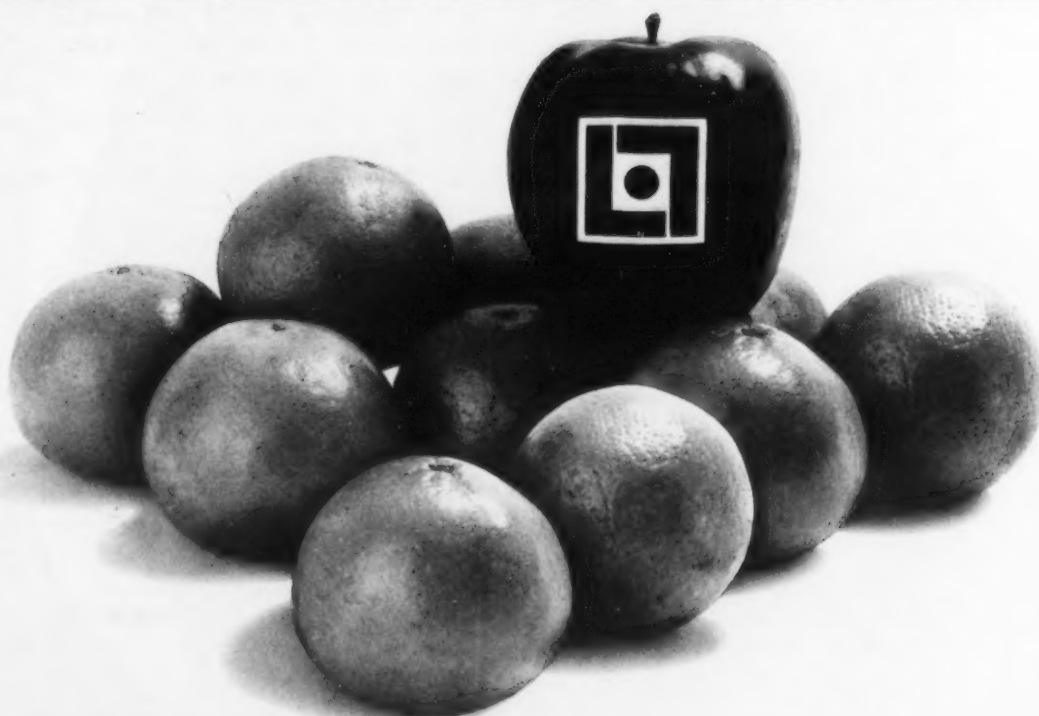
A short-form catalog is divided into six operational amplifier groups: low cost; FET-input; ultra-low-drift chopperless types; fast-settling amplifiers; high stability chopper-stabilized amplifiers; and femtoamp-resolution varactor bridge 'electrometer' types. The catalog is available from Analog Devices, Inc., 221 Fifth Street, Cambridge, Mass. 02142.

All products and services offered by Xerox Data Systems' systems products department are described in a new 16-page brochure available from XDS. The products and services described include XDS' line of integrated circuit logic modules, supporting hardware, automated wiring services, analog and digital instruments, minicomputer, magnetic tape transports, and head-per-track disk memories.

Copies of brochure 64-55-42A can be obtained by writing: Xerox Data Systems, Sales Promotion Dept., 5300 W. Century Blvd., Los Angeles, Calif. 90045.

Software systems for the Mac 16 and Mac Jr. computers are described in detail in an eight-page color brochure. Software capabilities include assemblers, loaders, ASA Fortran IV, monitors, executives, and the math library. Diagrams define real-time systems and core allocations. Free of charge. Write Mac, Lockheed Electronics, Data Products Division, 6201 E. Randolph Street, Los Angeles, Calif. 90022.

A new four-page brochure is available from Data Management Services, Inc. which describes the recently produced fuel oil distribution and accounting software package. For free copies write: Fuel Oil Distribution Brochure, Data Management Services, 31 Lewis Street, Hartford, Conn. 06103.



Logically speaking... you can't compare apples with oranges.

There is only one "big apple" to be bought in the data input market.

It's Logic's LC-720 KeyDisc Data Input System.

The LC-720 is a "whole" system... the most advanced, compatible, flexible and versatile system of its kind.

It has a whole range of applications and performs a broad-spectrum function.

But don't get it mixed up with those limited, basic systems designed for limited, basic use.

However, if you're shopping for a limited, basic system, we'll provide you with one that incorporates many of the advanced features of the LC-720.

Another shopping tip to remember... the LC-720 KeyDisc Data Input System

can save you up to 50% of data preparation costs.

And logically speaking, money saved is money earned.

Lewis Barr at Logic will tell you why the LC-720, big or small, is the best in the market. Call him at 609-424-3150.

It's the logical thing to do.

LC-720 KeyDisc System



21 Olney Avenue • Cherry Hill Industrial Park • Cherry Hill, N.J. 08034 • (609) 424-3150



June 3, 1970

Page 25

Wacom-16s Have 500 nsec Communications CPUs

ST. PAUL, Minn. — The Wacom-16 family of 16-bit computers features 500 nsec processors designed for high-volume communications and real-time applications.

Classified by the manufacturer, Weismantel Associates, Inc., as medium-priced systems, the Wacom-16s are available with a wide selection of peripheral devices and supporting software.

The family consists of two members, the Wacom-16 intended for use as a time-sharing, multi-processor system; and the Wacom-16C oriented toward communications control and message-switching applications.

The processor, shared by both systems, has a repertoire of 83 instructions. It contains a multi-task feature which allows any one of a number of task programs to be called up and executed under hardware control as directed by an executive routine.

Memory is expandable from

8K words to 65K words in 8K increments.

The standard instruction set includes hardware, binary multiply, divide and radix conversion. Additional arithmetic capabilities are provided by an optional Expanded Arithmetic Unit, (EAU) which provides double-precision fixed-point and single- and double-precision floating-point instructions.

The number of I/O channels on the processor is modular, with four channels in the basic processor. Expansions in increments of one channel to a maximum of 16 channels are optional. An option to provide paging of I/O data transfers is available.

Multiprocessor addressing is provided by the Multiple Access Controller (MAC) which allows two processors to access memory by providing additional paths on a modular basis. Paging on the multitask option provides linking of multiple tasks frag-

mented throughout memory under hardware control. Once initiated by the executive program, linking of the task segments is performed under hardware control by the processor logic.

The basic processor has a single set of index and accumulator registers. The handling of multiple sets of index and accumulator registers for independent tasks is a software function. Multitask operation, privileged instruction protection, memory protection, code protection, automatic index and accumulator store and restore, and paging are included in a single option, the company said.

Sequence Control

The Wacom-16C, unlike the Wacom-16, is equipped with sequence control, a special communications control device that is said by the manufacturer to reduce software overhead nor-



Wacom-16 Computer System

mally associated with controlling a variety of lines and code formats.

Sequence Control is said to provide complete hardware control of communications lines while providing compatibility with all industry standard computer and modem interfaces.

Used to perform code checking, code translation, interrupt processing and buffer swapping, it consists of groups of 60 nsec registers, many of which are dynamically reloadable under program control. This approach, the company said, allows up to 256 high-speed, full-duplex communications lines to be terminated in the Model 16C.

Peripherals

An operator's console is available with the Wacom-16. It provides systems controls and indicators and incorporates a 30 char/sec printer and a 55-key

input keyboard.

Paper tape capability is provided by a 300 char/sec reader and a 25 char/sec punch. A 300 card/min reader capable of reading column binary as well as BCD is available.

A magnetic disk subsystem with four drives attachable to one controller gives the system 20.8 million characters of on-line random-access storage per drive. The drive has an average access time of 57.5 msec and a transfer rate of 2.5 million byte/sec. A dual address controller is optional.

As many as eight magnetic tape transports can be attached to a controller. Standard tape speed is 25 in./sec, with 37.5 in./sec available as an option. The standard drive can read 800 bit/in. IBM-compatible 7- or 9-track tape. A 556 bit/in. tape density capability is available as an option.

The Wacom-16 can be equipped with a 300 line/min printer. It has 132 print positions and uses a 64 character set. Vertical spacing is either 6 or 8 line/in.

In addition, the system can be equipped with A/D and D/A converters, plotters, and various display devices.

The software of the Wacom-16 family includes an assembler, 1130-compatible RPG, Fortran IV and communications handlers, with an interactive version of Fortran IV to be available in September. The language processors are operated under an executive program designed to provide orderly control and coordination of all tasks submitted for execution. An on-line maintenance library for testing hardware and a general utility library is provided.

A typical Wacom-16 configuration, consisting of a 24K processor, operator's console, four magnetic tapes, one disk, card reader, line printer, and four communications line terminals would sell for about \$190,000 and lease for about \$4,800/month, according to the company. The systems have a six-month delivery schedule.

The address of Weismantel Associates, Inc. is Box 1957.

Company Says Varian-Compatible Disk Memory Priced Lower Than 620 Series

PALO ALTO, Calif. — The Data Disc Model 1703 is claimed to be the first disk memory priced lower than the Varian processors, with which it is compatible. The 1703 is available in four capacities from 32K to 262K words.

Priced at \$7,500 for the basic model, including installation, training, software, and one year's service, the 1703 is said to be so easy to operate and so reliable that it may be used instead of additional core memory.

Plug-to-plug compatible with the Varian 620 series of mini-computers, the disk system can use all existing Varian disk software, according to Data Disc.

The Model 1703 is supplied with a disk diagnostic program. Also available from the manufacturer will be software, including loader, monitor, read/write driver, editor, assembler, and bootstrap loader. Minimum configuration for use of the 1703 is 4K of core and a teleprinter.

The disk system has an average access time of 16.7 msec and can transfer data to the computer at rates to 122.8K word/sec. Individual words may be transferred by the computer with automatic parity generation performed by the disk controller.

The main components of the Data Disc memory are the 7200 Series Disc Memory, a power supply and the disk controller.

The 1703-3 system has a capacity of 32K words and is priced at \$7,500. The 1703-4 is priced at \$9,500 for 65K words of storage. The 1703-5 and 1703-6 have capacities of 131K words and 262K words, and are priced at \$14,500 and \$17,500, respectively. All models are available on a 30-day delivery schedule.

Data Disc Inc. is at 1275 California Ave.



Model 1703 Memory System

CDC Has Mini for Rugged Business Use

MINNEAPOLIS, Minn. — Originally designed to meet military shipboard specifications, the CDC 5100 minicomputer is now available to commercial users who operate under extreme environmental conditions.

Said to be capable of withstanding temperature, corrosion, vibration, shock, and humidity extremes, the 5100 is suitable for such applications as data acquisition and control systems, process control, message switching, and programmable displays.

The processor features a memory capacity from 4K to 65K 16-bit words, expandable in 4K increments. Memory cycle time is 3 μ sec. Four 32-word general-purpose register files are said to make the 5100 particularly suited to processing external interrupts, with multiple register sets eliminating the need for storing and restoring register contents.

34 Instructions

The processor has a repertoire of 34 basic instructions, including ADD, SUBTRACT, MULTIPLY, SHIFT, logical branch, input, output, and control opera-

tions. Single or double precision is selectable on all instructions except for control commands. Direct, indexed, indirect, and relative addressing schemes may be used.

A standard I/O channel, compatible with the CDC 1700 channel, allows the use of 1700 peripherals with the 5100. The 1700 is currently CDC's smallest data processing system. The 5100 can transfer 16-bit full words under program control. It has 16 input lines, 16 output lines, 16 select lines, and six control lines.

Data transfer rate through the channel is 55K word/sec. A maximum of 333K words can be transferred to or from memory through the optional direct memory access channel.

In addition to the memory expansion and 1700 interface options, an interface to allow the connection of ASR 33 or ASR 35 Teletype units is available. Other options include maintenance panels, power supply, a stand-alone paper tape reader and hardware multiply

and divide.

Peripherals

Peripherals available are largely those of the 1700. These include drums ranging from 65K to 542K words, disks with a capacity of 1.5 or 3 million words, and 7- and 9-track 37.5 in./sec tape drives that can read 200, 556, or 800 bit/in. tapes.

A 330 card/min reader; a 300 card/min read, 100-460 card/min punch unit; and a 300 line/min printer are also available. Communications devices such as a single channel controller that can connect up to 32 devices, multiplexers that can handle as many as 16 lines and data set adapters that can handle from 600 to 40.8K bit/sec. are available.

Software includes an assembler, simulator (interpreter), program preparer, tape preparer, math package, and maintenance routines.

The basic model of the CDC 5100 has been priced at \$16,700. It is currently available on a six-month delivery schedule.

Independent Supplier Features Front-End for 360s

MOORESTOWN, N.J. — A front-end for the IBM 360/30 and up, made by an independent supplier, the Ultronic Systems subsidiary of Sylvania Electric Products Inc., allows multiplexing.

Designated the Communications Interface Processor (CIP), the front-end permits transmission of high-speed (1,200 to 9,600 bit/sec) multiplexed data directly into the system without

software modification, the company said.

The CIP, a complete turn-key system, is plug-to-plug compatible with the IBM 2702 and 2703 Transmission Control Units. The CIP will support up to 176 low-speed lines with terminals which include Teletype Models 33, 35 and 37 and IBM 2740 and 1050 terminals.

The equipment can perform code conversion, a spokesman

said. The unit communicates with the attached multiplexers through full-duplex voice grade lines. Up to 12 of these multiplexers can be connected to the

Systems/ Peripheral

CIP. The speed of the voice grade lines are variable to meet system requirements.

The compatible IBM

units — the 2702 and 2703 Transmission Control units — are associated with IBM 360/25s and up (with the exception that the 2703 does not communicate with the Model 44). The 2702 is a smaller version of the 2703.

The basic price for the IBM 2703 is \$65,485, with rental at \$1,450/mo. Delivery is six months. The base price for the Ultronic CIP ranges from \$52,700 to \$61,800 plus \$3,600

per high-speed channel. Five lease plans for one, two, three, four, or five years are offered. Delivery is four months for the Ultronic unit.

Ultronic Systems is at Mt. Laurel Industrial Park.

Acoustic Data Set Kit Designed for Model 33 Teletype

NILES, Ill. — ComData Corp. is offering an acoustic data set kit designed for 20-minute installation within Model 33 Teletypes.

The Model 301P acoustic data set kit has all the standard and optional features of the ComData 301A unit. Features of the unit include answer/originate switch; half/full-duplex (copy) switch; and loop-back (echo) switch. The data set has a rate of up to 300 baud.

In time-sharing applications the terminal retransmits the data back to the computer for error analysis, the company said. RS-232B interfaces provide interconnection with associated card readers/punches and CRT displays.

A telephone-line jack permits hardware connection to the dial-up network through DAA (data access arrangement) or direct connection to a private line. A carrier detector indicator shows whether the signal level is adequate for communications.

Configurations of the Model 301P can be made available for use in other teletypewriter and CRT terminals, the company said.

The basic Model 301P sells for \$295.

ComData Corp. is at 7544 W. Oakton St.

Speedreader

WOODLAND HILLS, Calif. — Data Products Corp. is offering a 600 card/min card reader, the Speedreader 600 (SR-600) which maintains a rate of 600, 80-column card/min or 750, 51-column card/min.

Uptime Corp., a subsidiary of Data Products, is manufacturing the SR-600 and is located in Denver, Colo.

New kind of tape measure



Since its introduction, JTC/TST (total-surface tested) Tape has become the computer tape against which others are being compared.

And comparisons are proving JTC tape outstanding in test after test, installation after installation. Here's why:

- It's the most durable, dropout-free tape available.
- Special polyester film backing gives more strength and flexibility... binds the oxide coating indefinitely... resists the backing debris phenomenon.
- Color Coding. At no extra cost, you may choose nine different, adhesive-backed color rings for quick and sure identification.
- Smoothest tape in the industry!
- Strong, thin case may be stacked interchangeably with your present library.
- JTC's three year warranty.

JTC tape sales are breaking through new barriers every month. See why for yourself. And add a new measure of performance, quality and confidence to your computer operation.



Data Processing Cards • Computer Tapes
Ribbons • Disc Packs • Tape Maintenance
Jersey Tab Card Corporation
649 Rahway Avenue
Union, New Jersey 07083
(N.J.) 201 MU 8-1700
(N.Y.) 212 WO 4-2930

If You're Reading Someone Else's
COMPUTERWORLD
Why Not Do Yourself A Favor
Reserve Your Own Subscribe Today

USE YOUR COMPUTER TO MAKE A PROFIT.

Delta's Responsibility Accounting System for banks will give you an instant program on which to build a viable, comprehensive profit plan. The system provides for a 5-year projection of income and expenses with a detailed monthly projection the first year and comparative monthly reports thereafter to report deviations between performance and projections. Other bank packages include: General Ledger, Credit Card, Installment Loans, Plan for a profit. Contact:

DCS DELTA
COMPUTER
SYSTEMS, INC.

Lenox Towers, Suite 1333, 3400
Peachtree Rd. N.E., Atlanta, Ga.
30326 (404) 266-0583

Dial-a-Drill Brings Computerized Instruction Into Home

By Harvey Elman

CW Staff Writer

NEW YORK — Dial-a-Drill, an elementary school experiment sponsored by the New York Board of Education, reinforces the mathematical principles studied during school hours by using a telephone to bring computerized instruction directly into the home.

Most of the 2,400 Dial-a-Drill pupils, who generally are in Grades 2-6 in 10 city schools, receive three five-minute drills a week. An exception is Grade 3, where, for experimental purposes, the drills were increased to five or six a week.

It was this group that showed a 20% gain in mastery of computational skills as of last month, according to Austin Sobers, director of the program. Results for the remainder of the participants will be released July 1, but Sobers is optimistic that overall improvement will be borne out by the statistics.

Student Cannot 'Fail'

One reason for the one-year-old program's apparent success, it is thought, is that a student cannot "fail" in the conventional sense. The DEC PDP-8/I automatically adjusts the drills to fit the level of difficulty at which the student may best operate. When a student has demonstrated mastery at one of 25 levels, the computer moves him up a notch.

"The effect of all this," said Sobers, "is usually to give the child a feeling of sustained progress and success, even though he may give some wrong answers along the way."

Carlton Harrison, who is now in Grade 7 but entered the program in Grade 6, testified to another apparent advantage: "With the computer, you don't have to worry about being embarrassed if you answer wrongly, or worry about competing with the rest of the class."

He Just Says No

"If I don't get it right," he said, "I'm not on the spot. He (the computer) just says no, and no one can say, 'Ah, you're stupid,' and stuff like that. And you don't have to write everything down. There's no paper work."

The PDP-8/I, programmed to drill a student at his own pace, is connected to the student's home by simply dialing the proper telephone number.

In some cases, an attendant at the computer center will talk to the student, after the call is put through by identification number, to insure that the student receives the proper drill.

The computer reviews the student's record, then poses its questions through a

voice response unit. It might ask the student to solve a problem in subtraction, multiplication, division, or addition as well as to increase the number of digits involved.

The student listens to the problem and responds by pushing the touch-tone but-

Education

tons on his phone. If the answer is 89, for example, the student would push the eight and then the nine. The computer promptly decides whether the student has given the right answer.

The program's chief creator, Dr. Patrick Suppes of Stanford University, said Dial-a-Drill can be used just about any place that there is a telephone — in adult education centers, homes, hospitals, businesses, for example — where people want instruction in basic education skills.

Even now, 125 adults, most of them

parents of Dial-a-Drill children, are taking practice in mathematical computation from 9 a.m. to 2 p.m. The students use the program from 3:15 p.m. to 10 p.m. Also using the computer are 22 hospitalized children in four city hospitals for one hour in mid-afternoon.

Random Selection

The 2,400 Dial-a-Drill students are randomly chosen by school principals after being grouped by academic and economic status. If a pupil records 50% incorrect answers on his weekly printout, he is assigned to a remedial program in which a special worker will provide extra tutoring in the child's home. This supplemental counseling is also provided upon special request. Currently, one worker is provided for each 125 students.

If the computer had enough users, Suppes said, the cost per pupil could be reduced to less than \$50 a year. That, he believes, would make it economically

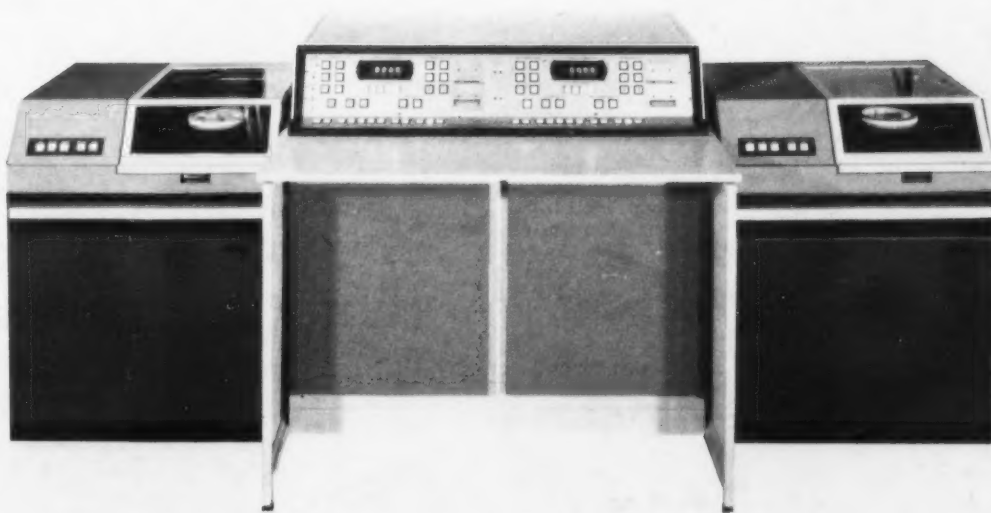
attractive and counter the criticism, often leveled at computer-assisted instruction (CAI), that it is too costly.

Sobers states that Dial-a-Drill is currently costing the state about \$130 a pupil. State education funds provided most of the money, but the New York Telephone Co. chipped in with \$25,000.

Dial-a-Drill, as now constituted, has obvious limitations. It is not, for example, suitable much beyond basic skill subjects, in which critical thinking and concept formation are not involved. It does not help a child to understand mathematical relationships, but only to practice computation.

Suppes said that CAI is being used at Stanford to teach languages, mathematical logic, and programming. And he said his group at Stanford is now working on supplementary workbooks to enable elementary school children to use Dial-a-Drill for practice in reading and foreign languages.

How Do You KNOW Your Disk Packs Are Error-FREE?



Now you can tell by using this equipment.

Make sure your disk packs will perform "as advertised". Find the magnetic misfits of the disk pack world.

Better than a computer.

At a fraction of the cost.

This advanced electronic Certifier will allow you to find the clumps, voids and scratches which cause errors in 6-high and

11-high packs. It also finds soft errors missed by a conventional computer system. These errors are not consistently detected by a computer.

The testing criteria may be set to the new GSA government standards . . . or yours.

Write for the whole story. Or if your need is urgent phone (405) 848-2633.

Three Michigan Universities Form Computer Network

EAST LANSING, Mich. — Financed by a \$400,000 appropriation from the Michigan state legislature, and an equal amount from the National Science Foundation, Wayne State University, Michigan State University, and the University of Michigan have joined forces to form the Merit Computer Network (Michigan Educational Research Information Triad).

Wayne State and the University of Michigan both use IBM 360/67s, although each uses a different master operating scheme; and MSU has a CDC 6700.

Although computer-aided instruction is still in its infancy, researchers at the three universities hope that a computing network will spur application of computer technology to classroom learning and teaching.



INTERSCAN

INTERSCAN, INC.
5200 Belle Isle
Oklahoma City,
Oklahoma 73118

Stanford Project Shows Reading Improves With CAI

PALO ALTO, Calif. — Results seem to be proving the contention of a Stanford University professor that computer-assisted instruction (CAI) can greatly help a child learn to read better.

The professor, Richard Atkinson, chairman of Stanford's psychology department, reported that those students who learn to read through CAI "demonstrated remarkable improvement" over the others. The computer involved is a DEC PDP-10 at the Stanford Computation Center. The schools concerned include five in the Ravenswood school district.

Students receive instruction for the exercises by means of digitized audio messages. A vocabulary of about 5,000 sounds has been recorded and stored in digital form on the computer's magnetic disk. The student inputs his responses on the teletypewriter keyboard. When he has completed his response, he presses the space bar which returns control of the terminal to the computer for response

evaluation. If the student discovers an error in his response, he may press the rubout key before pressing the space bar and the entire problem will be presented again for a second trial.

House, Cat, Green

For example, one exercise furnishes the child with three words: house, cat, green. The computer voice instructs the child to "type the word that stands for an animal." If the student responds correctly, the voice says, "Good," and the next exercise appears.

Atkinson noted that girls are far better in initial reading than boys. An experimental group run on CAI showed a marked improvement over the control group, and also the difference between girls and boys was virtually eliminated.

The growth of the CAI project at Stanford University is in many respects illustrative of developments in the entire field over the past several years, according

to Atkinson. The earliest effort, which began in 1965, was a drill-and-practice mathematics program. Now, programs operating off that PDP-1 system have grown from an original 41 students to more than 3,000 per day and cover, in addition to an expanded mathematics program, programs in spelling, algebra, logic, Russian, and computer programming.

The Stanford-Brentwood CAI project originally used the IBM 1500 system, and computer-assisted instruction was provided in initial reading and first- and second-grade math. Contributing to the design and production of these tutorial programs was a large staff that included writers, mathematicians, artists, programmers, engineers, curriculum specialists, and experienced elementary school teachers.

Not Used as Processors

At the present time, the central processing unit for the reading curriculum, as

well as the math, logic, and Russian programs, is the PDP-10. It is connected to a PDP-8 at the institute laboratory at Stanford University and is connected by a private high-speed data telephone line to another PDP-8 in the Brentwood laboratory in the Ravenswood school district. The PDP-8s are not used as processors. They monitor the flow of information between the PDP-10 and the student state teletypewriters.

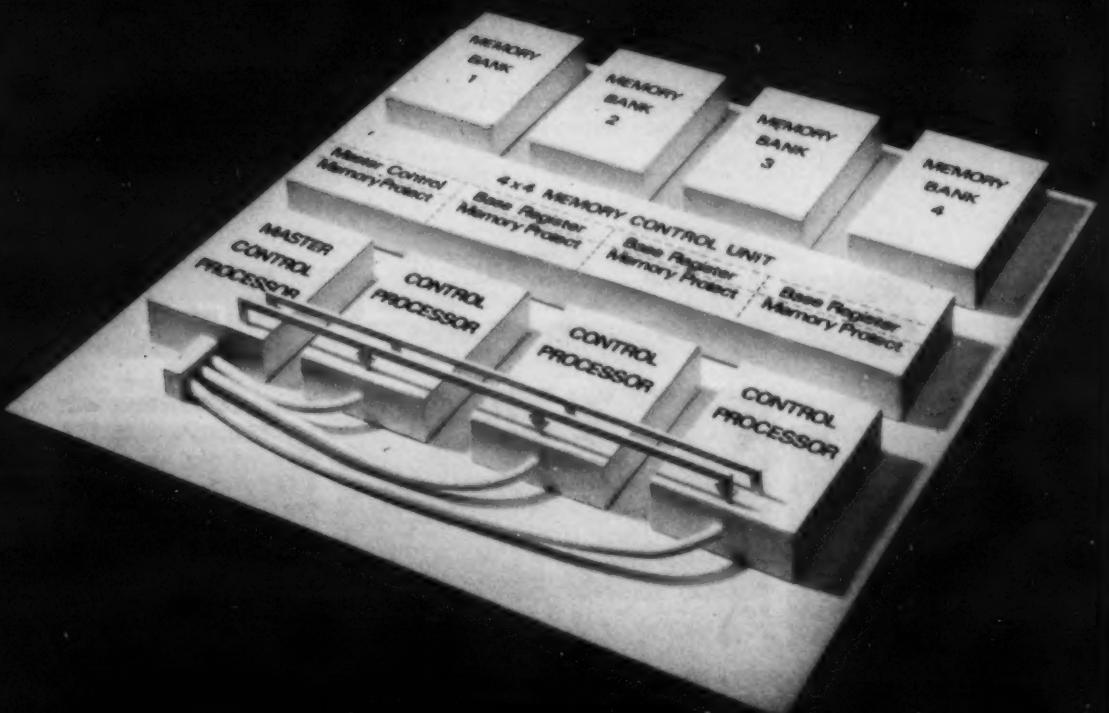
As many as 1,400 students in the Ravenswood school district receive daily instruction in both reading and math on 46 teletypewriter terminals. Specially equipped Model 33 Teletypes serve as student terminals for the reading program.

"In my opinion," Atkinson said, "the single most important factor in the development of CAI is the potential that it offers for answering today's most pressing need in education — the individualizations of instruction."

He said that children enter school with remarkably different abilities and levels of knowledge. They work at different rates and with different degrees of accuracy and understanding. "To accommodate to these individual differences is a continuing and overriding concern of our educational institutions. Computer-aided instruction does offer the real promise of a technique that can be used in the public schools to meet the problems of individual differences at a deeper level and in a more scientific way than as yet has been possible."

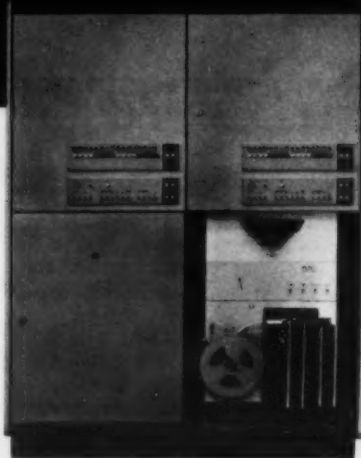
Serious CAI applications are now in progress in many universities throughout the U.S. and Europe.

MULTIPROCESSOR



2x2 or 4x4 Multiprocessor The Tempo 1 Multiprocessor configuration provides a fully compatible processing power expansion. As many as four processors can communicate simultaneously with up to four 65K x 16 banks of memory with full dynamic cross-bar switching.

Any processor or user device, interfaced to either the Tempo 1211-2x2 memory control unit or the Tempo 1221-4x4 memory control unit, may select any memory region relative to its own base register. Memory bank access conflicts



TEMPO
Computers • Data Communications Equipment

are resolved by a patch-board priority resolution network. Processor-to-processor communications and memory-to-memory high speed block data moves are supported by Tempo master and mini monitor modules.

All software systems and user programs developed for the stand-alone Tempo 1 computer will operate without change on the Tempo 1 2x2 or 4x4 multiprocessor.

Call or write now for detailed catalog information.

See Tempo equipment in operation at the Spring Joint Computer Conference... Display #13009-11.

Calendar

June 3-5, New York City — A rescheduled meeting entitled "Unbundling Computer Support Services: Effects on Your Systems Cost Strategy." Also on June 10-12 a meeting "The Minicomputer Invasion," and on June 22-24 "EDP Facilities Management: Abdication or Salvation?" Contact: AMA, American Management Association Building, 135 West 50th St., New York, N.Y. 10020.

June 16-18, Washington, D.C. — IEEE Computer Group International Conference and Show with the theme "Memories, Terminals, and Peripherals: Challenge of the Seventies." Contact: Don E. Doll, IBM, 18100 Frederick Pike, Gaithersburg, Md. 20760.

June 16-18, Iowa City, Iowa — Conference on Computers in Undergraduate Curricula presented by the University of Iowa. Contact: Director of Conferences, Center for Conferences and Institutes, Iowa Memorial Union, The University of Iowa, Iowa City, Iowa 52240.

June 16-26, Cambridge, Mass. — MIT presents the 1970 Summer Session in Industrial Dynamics. Contact: Director of the Summer Session, Room E19-356, Massachusetts Institute of Technology, Cambridge, Mass. 02139.

June 23-26, Seattle, Wash. — DPMA 1970 International Data Processing Conference and Business Exposition. Contact: DPMA 1970 International Data Processing Conference, P.O. Box 502, Park Ridge, Ill. 60068.

UF Gets \$450,000 NSF Grant

GAINESVILLE, Fla. — A three-year, \$450,000 grant has been awarded the University of Florida by the National Science Foundation for improvement of its academic computing center.

The grant will help support a proposed program to make university computing services available to students and researchers in other state schools.

Wanna see how fast we can deliver a PDP-8/L?

Wanna see it again?

Digital Equipment Corporation
Maynard, Mass. (617) 897-5111

digital
COMPUTERS · MODULES

'Bug' Serves as Discussion Forum for DP Managers

By Drake Lundell

CW New York Bureau

NEW YORK — A new type of users group, called the Businessman's Users Group (Bug), is composed of about 50 members drawn primarily from the data processing manager's level of major corporations and serves as a clearinghouse of information and a forum for the discussion of common problems.

Bug, developed by Robert S. Snoyer, president of Faim Information Services Inc., is a completely informal five-year-old organization without dues or membership requirements, except that members must have an interest in, and responsibility for, DP activities within their organizations.

Unlike most other user groups in the computer industry, it is not restricted to users of one type of computer equipment, Snoyer said. And it tries to assess broad issues which would have an effect on many various types of organizations.

The organization, which meets monthly at the Harvard Club in New York, also helps to prevent duplication in efforts among its members on an informal basis. If a member is planning to develop a new program, for example, he might talk to other members to learn what other programs are available or to hear the experiences of other members with software houses, Snoyer said.

A need exists for better communication between top-level management and the DP departments, he continued.

To fill this need, a Management Users Group (Mug) was formed, and is limited to corporate officers responsible for overseeing DP operations without being involved on a daily basis.

The objective of this organization is to present the top management with some of the problems affecting the daily working of a DP operation. Top management must be acquainted with problems not limited to its firms and must receive an

informal, two-way dialogue between the actual users and overseers of DP operations. Mug meets five times each year.

The Bug organization has already spread to Philadelphia, Snoyer reported, and is

expected to expand further in the near future. The local groups would be virtually autonomous, but may coordinate speakers and topics with other organizations, he said.

18-Month NAS Study to Focus On Solving Library Problems

WASHINGTON, D.C. — Defining the potential contribution of computers and related technologies in helping to solve problems which face the nation's libraries will be the objective of a study the next 18 months by a special panel of the Computer Science and Engineering Board of the National Academy of Sciences.

The study, supported by the Council of Library Resources, is designed to identify areas of library operation in which the application and use of computers can

make a substantial contribution to satisfying the needs of library users.

During the initial phases of the study, a number of operational and prototype computer-based libraries and library systems will be analyzed by the panel, as well as selected conventional library activities which incorporate varying degrees of automation.

Methods will be sought for coping with the increasing volume of library materials which now compete for shelf space and which become part of the announcement, identification and retrieval problems when on the shelves.

Societies

Although a large number of experimental and operational computer applications to the overall national information handling system have been devised, in many cases the computer science and engineering basis for responding to near-term and long-term needs is not clearly understood. The panel will undertake a comprehensive review and analysis of the current computer systems, their capabilities, techniques and associated technologies in order to determine the most appropriate application to library and other information activities.

The information systems panel, composed of technical experts in the various aspects of the study, is headed by Ronald L. Wigginton, director for research and development at the Chemical Abstracts Service, Columbus, Ohio. Panel members are: F. T. Baker, Federal Systems Division of IBM, Gaithersburg, Md.; Joseph Eachus of Honeywell EDP, Waltham, Mass.; Douglas Engelbart, Augmented Human Intellect Research Center at Stanford Research Institute, Menlo Park, Calif.; Gerard Salton, Computer Science Department, Cornell University; and James E. Skipper, university librarian, University of California, Berkeley.

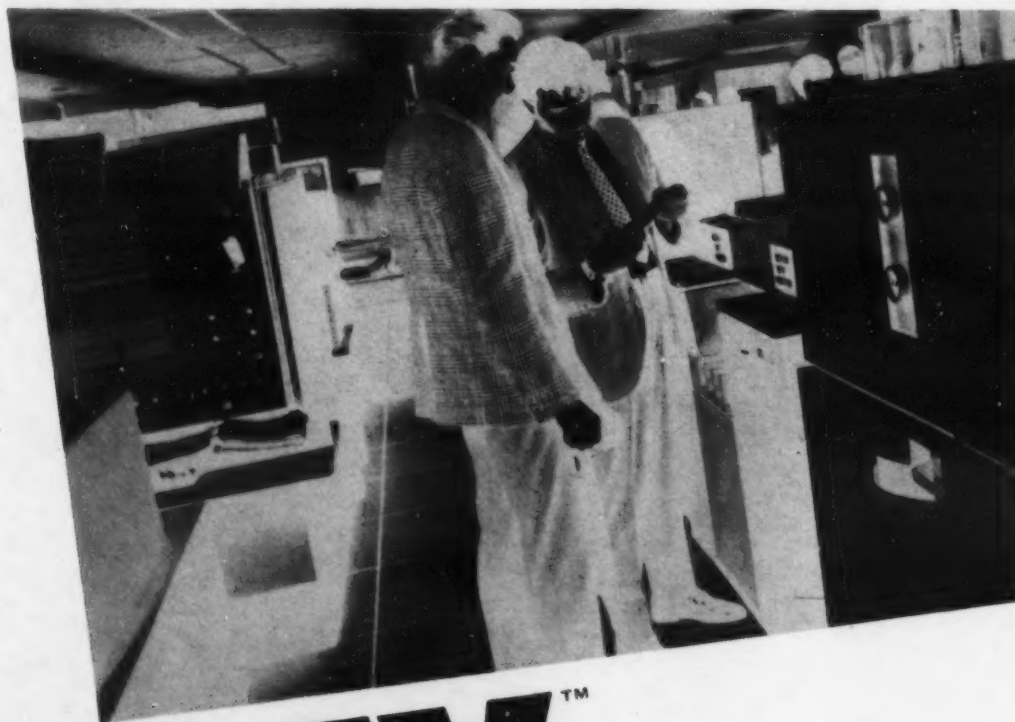
CPMA Incorporated As Non-Profit Trade Group in Washington

WASHINGTON, D.C. — The Computer Peripheral Manufacturers Association has been officially incorporated as a non-profit trade association and has opened a national office in Washington, D.C.

With L. Richard Caveney as president and 29 company members as of this date, the CPMA has already been meeting some of the industry's problems head-on. John Nidecker, deputy special assistant to President Nixon, recently invited Caveney to discuss those phases of the government's EDP procurement activities which were of interest and concern to the CPMA membership.

In addition to the 29 initial members, over 40 other companies have stated that they will join the CPMA within the next few months. Membership is expected to reach at least 100 by this fall.

Plans are now being considered for a "Peripheral Expo" — an exposition of products and services offered by the members of CPMA. This will be the first computer equipment exposition conducted by the manufacturer's themselves.



X-RAY™

Now, for the first time, there's a way to monitor total system performance.

Our new X-RAY enables you to "see inside" your computer system to determine operating efficiency and to pinpoint ways to dramatically improve performance and reduce costs.

X-RAY is a truly unique hardware/software monitoring system which is capable of analyzing all aspects of system performance, specifically including:

- Configuration Utilization
- System Software Overhead
- Application Program Efficiency
- Program and Data Base Organization

X-RAY (Execution-Recorder / Analyzer) provides a high resolution, real-time signal collection and data reduction facility for a detailed analysis of total system performance, yet creates no operating overhead for your system. Data is collected using passive

techniques, partially reduced on line, and then recorded on magnetic tape for post processing by the X-RAY Analyzer.

Detail and summary reports are produced for system configuration usage, operating system overhead, individual problem program execution, and data base activity. Results may also be a source of input to the CASE system simulator for performance predictions.

X-RAY is available under purchase, lease, or service plan. To find out how X-RAY can improve your operations (actually pay for itself many times over), contact us for more information.

APPLIED SYSTEMS DIVISION
Computer Learning and Systems Corporation
5530 Wisconsin Avenue
Chevy Chase, Maryland 20015
(301) 652-9220

Powerful as PDP-11's CPU is, it is right down with the peripherals, plugged into the UNIBUS® just like they are.

Now the devices are independent, asynchronous. They can send data to each other—or direct to memory—along the bus without addressing the CPU. Memory can transfer to memory. New devices, or memory, can join the system by just plugging in.

The UNIBUS makes PDP-11 infinitely variable, infinitely expandable. Even the pluggable CPU can be replaced. Altogether, PDP-11 is the most versatile small computer system ever made.

Small? Over 400 instructions. Eight general registers: bit, byte, word, and multi-word capability. Up to 32K 16-bit words, 64K bytes, optional to 128K 16-bit words, 256K bytes. Hardware stacking capability. Automatic nesting of interrupts and subroutines. Re-entrant and relocatable code. Multiple channel DMA. Prices starting at \$10,800 including Teletype and 4K of core.

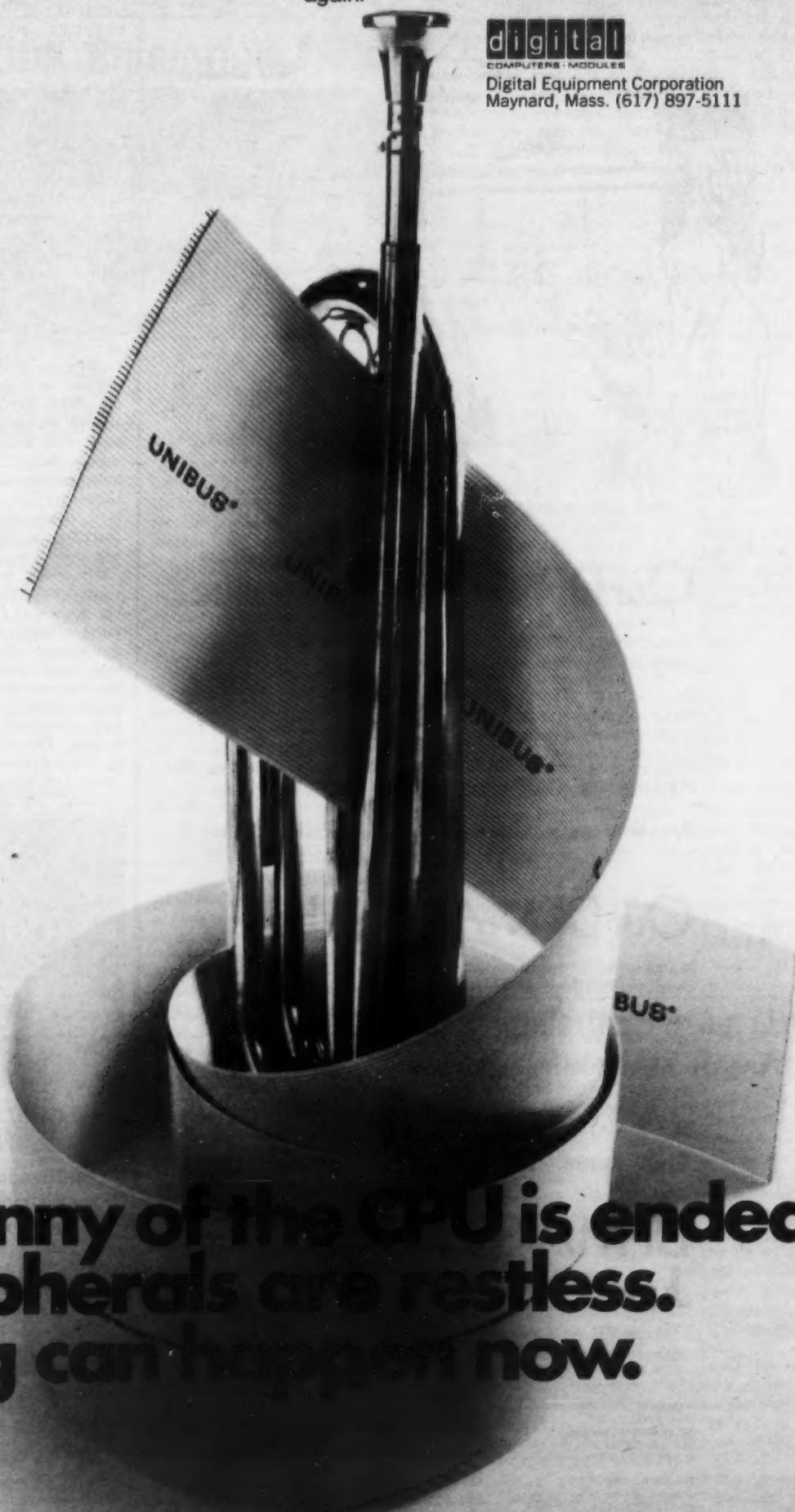
Actually, PDP-11 can be small when you want it to be. But only in memory (dedicated 1K read-only, plus 256 words of read-write) and in price: \$7700.00.

The mini-computer bureaucracy will never be the same again.

digital

COMPUTERS • MODULES

Digital Equipment Corporation
Maynard, Mass. (617) 897-5111



**PDP-11:
The tyranny of the CPU is ended.
The peripherals are restless.
Anything can happen now.**

DPMA DPMA DPMA DPMA

Top Systems Execs Go to DPMA. Computerworld goes to Top Systems Execs.



Our DPMA Preview Issue.

If you'd like to get to 18,500 top system execs a week before they get to Seattle, plan on advertising in Computerworld's Special DPMA Preview Issue.

Of our more than 35,000 paying subscribers, 18,500 are top systems execs. Better known by our advertisers as the Primary Buying Influences of computer products and services.

Primary Buying Influences who use computer systems that account for 90% of the total value of all U.S. systems.

Preview Issue: June 17

**Closing: June 5
Color: May 29**

Our DPMA Show Issue

In addition to our regular circulation of 35,000, 5,000 bonus copies of Computerworld's Special DPMA Show Issue will be passed out at our booth.

So your ad will turn up again, in front of the top systems execs who turn out at the show.

They're the Primary Buying Influences who have up to \$10,000 purchasing power on their own authority. And we're the computer publication they spend their time and money to read. Computerworld has the highest all-paid circulation in the EDP field.

Show Issue: June 24

**Closing: June 12
Color: June 5**

DPMA Show dates: June 23-26

To reserve your advertising space for DPMA, just call the Computerworld representative nearest you. He'll help you get top billing for the show.

National Sales Manager:
Neal Wilder
Sales Administrator:
Dorothy Travis
(617) 332-5606

New England:
Robert Ziegel
(617) 332-5606

Mid. Atlantic:
Donald E. Fagan
(212) 532-1790

Phila. — Wash., D.C.:
John Cummings
(212) 532-1790

Midwest:
Bill Farrell
(312) 944-5885

Eastern Midwest:
Joe Daniels
(312) 944-5885

Southeast:
Ed Graham
(214) 638-1140

Los Angeles:
Bob Byrne
(213) 657-6221

San Francisco:
Bill Healey
(415) 362-8547

Frederick Brooks Named DPMA Man of the Year

PARK RIDGE, Ill. — Frederick Phillips Brooks Jr., chairman of the Department of Computer and Information Science, University of North Carolina, has been named the 1970 DPMA computer sciences man of the year.

Brooks' work has been recognized as one of the most important influences in the development of third generation equipment. As project manager for the IBM System/360, he was responsible for the line management of the computer architecture and for the engineering development of Models 50, 65, 75 and the first phase of Model 91.

This assignment also included corporate-wide coordination and approval of the aspects of the project implemented by other IBM divisions, such as the engineering of Models 20, 30 and 40, specification and engineering of the input-output devices and development of software.

An award in recognition of his selection will be presented to Brooks in absentia by D.H. Warnke, international president of DPMA during DPMA's 19th annual international conference and business exposition in Seattle June 23-26. Brooks is now on sabbatical leave at the University of Twente in The Netherlands doing research and teaching, as visiting professor, one course in computer science.

The award is the second bestowed by DPMA, for outstanding service in the field of computer sciences and information processing, since the program was inaugurated last year. The first was presented to Commander Grace Murray Hopper, director, Programming Languages Group, Office of Information Systems Planning and Development, U.S. Navy.

Brooks' unified concept ap-

proach to the design of both hardware and software for the third generation computer equipment is said to have changed the direction of computer development.

The 39-year-old administrator, inventor, engineer, mathematician and educator is coauthor

Societies

of one of the definitive books on automatic data processing, and author or coauthor of 16 papers and articles on this subject, ranging from the highly technical to the managerial and philosophic. He has lectured in the U.S., Australia, and Europe.

Morris to Keynote DPMA Meeting

PARK RIDGE, Ill. — Robert Morris, educator, author, and former legal adviser to congressional committees on internal security, legislative, and international affairs, will be the keynote speaker at the 1970 DPMA International Data Processing Conference and Business Exposition in Seattle, June 23-26.

Morris is currently president of the University of Plano, Texas, which he founded in 1964, and former president of the University of Dallas.

He will speak on "Today's Unrest," dealing with some of the causes and factors surrounding the unrest which is affecting national affairs, and relating it to the overall security posture of the nation.

An author of three books — *Disarmament: Weapon of Conquest*, *No Wonder We Are Losing*, and *What is Developmental Education?*, Morris also writes a weekly column, "Around the World."

ATTENTION! COMPUTER SCHOOLS

1/3 MORE SALES CAN BE
YOURS WITHOUT ANY
ADDITIONAL
EXPENSE OR INVESTMENT

Distributorships available for our unique, programmed instruction, home study course teaching computer programming to beginners. Very high discount.

You sell - we service!

THIS IS WHY YOU CAN'T TURN DOWN OUR OFFER

1. No additional cost to you.
2. No additional salesmen needed.
3. No additional advertising expense.
4. No additional leads necessary.
5. No additional instructional expense.

For complete information, write to:

CW Box # 3204
60 Austin Street
Newton, Mass. 02160

June 3, 1970

Page 33

Official Stresses Profit Motive for Manufacturers

ST. PAUL, Minn. — A computer industry official feels that manufacturers "must become much more conscious of the profit motive if the industry is to mature in the face of growing economic and competitive pressures."

T. Paul Bothwell, vice-presi-

dent and general manager of Honeywell's Computer Control Division, told the recent Printing Industries of America convention here that "the day is past when computer manufacturers will invest large sums in developments simply because of the computer user's demand.

"It will become increasingly necessary for the user to ultimately bear the cost of not only the equipment he needs, but of the development of his system." He said this trend will bring increased emphasis to standardized systems and the production of what he described as

"utilitarian" industry applications.

"Although new equipment will continue to appear at what may be a bewildering pace," Bothwell said, "it will be a simple and gradual extension of already available devices which employ already-understood approaches. Changes in the seventies are going to be evolutionary and not revolutionary."

He added that the price-performance ratio of hardware, which has shown an average 70% improvement each year over the last 10 years, will decrease only slightly, maintaining a 50% rate over the next five years. He said that competition, the rising costs of labor, and leveling off of production are the prime factors that will continue to affect the price and performance of hardware.

System Trends Emerge

Several "system trends" are emerging that will have a significant impact on all major industries, he told the printing association. One of the growth areas will be in distributed systems, where single and mixed-vendor computer models in particular will be communicating in unison either on site or in on-line, real-time situations.

This trend will lead to larger, lower cost data banks, he believed, which, in turn, would produce a "vast proliferation of data communications equipment designed to sift concentrated blocks of meaningful information before feeding it to the bigger computer."

"Concurrent with the development of large network systems will also come an increased use of minicomputer dedicated systems," Bothwell said. "Minicomputers at the moment are general-purpose devices, but during the seventies, they will be developed around a class of applications that will require certain characteristics and certain properties. Such developments," he added, "will occur in areas where the size of the market can

justify the development of such special-purpose minicomputers."

He indicated there would be a trend toward development of "intelligent terminals" in graphics, optical scanning, data transmission, and data preparation fields. Such terminals will have programming, identification and data processing capabilities, he said.

"Users want customized low cost, high reliability terminals, and manufacturers want a more clearly defined need so that the volume requirements can be forecast more stably. What is needed is a marriage. So far there have been a lot of responses, but the products have had several limitations."

Deep Concern

Bothwell said the computer industry "will continue to be an industry deeply concerned with its customer needs and caught up in the rapid evolution of its technology, but far more concerned than in the past with optimizing the life of its products."

He told the printers of four approaches he felt would be of the most benefit to both the user and manufacturer. "First there must be a careful analysis and clear understanding of your needs; group action is necessary to state those needs to the computer industry; users must be willing to co-invest to obtain the desired results; and finally they must continue to develop expertise in understanding the capabilities of computers, because it's the only real assurance of getting a fair value on their capital outlays."

"The competitive situation of the seventies simply will not allow the computer industry any form of charity or the users any poor investments. Both sides face the challenge of bringing together their needs and capabilities to be sure the most is made of the opportunities we jointly face in the '70s," he stated.

Computers Change Film Animation Field

By Phyllis Huggins

CW West Coast Bureau

BEVERLY HILLS, Calif. — Computers and "show biz" can be a happy marriage of technology and art as evidenced by the work of Computer Image Corp., Denver, which uses a specially designed hybrid system to rescue animated art from its hand-crafted state.

Bruce L. Birchard, president of this firm, predicts the film animation industry will be revolutionized by the use of computers in a manner similar to the effect of the introduction of the printing press on the book world.

The animation film and even the cartoon short have all but disappeared from filmland as an art technique. They have survived primarily in industrial and educational films, in advertising, and as "titles" for live action films, or as pared-down minimal animation films for children's TV shows.

Animation films have been priced out of the market and are too time-consuming due to the hand-crafted manner of creation. *Snow White* and *the Seven Dwarfs*, for example, took three years to make and involved a



Comedian Tommy Smothers, a director of Computer Image Corp., manipulates the Scanimate system.

finished product of 250,000 hand-drawn and hand-colored "cells" with three times that many drawn, painted, and discarded.

Lee Harrison III, now chairman of the board, approached the problem from the viewpoint of customizing technological devices throughout the entire process.

Entertainer Tommy Smothers is a director of the firm now actively acquiring animation and live ac-

tion companies. The analog method is now employed although the Caesar system, which is still being developed, will use a Honeywell H-316 as its digital core. This new method is capable of generating visual characters and the firm expects to obtain "Snow White" quality capabilities.

In the current system, designated Scanimate, a special TV camera photographs a piece of art and converts it into electronic impulses to be picked up by the analog computer. These impulses can then be changed by controlling dials to expand, contract, whirl, bounce, or otherwise animate the design. When the desired effect is achieved, it is filmed "live" on a CRT screen. A project which may have taken three months to complete by traditional methods can now be completed in three days.

Instead of depersonalizing the artist, the computer system and artist may now work together. He is able to see how his design moves and to record various changes on-the-spot.

ILO Considering 'Leap Frog' Plan

By M.W. Martin

Special to Computerworld

MELBOURNE, Australia — A five-year-old plan to use computers to increase management ability in developing countries is receiving detailed consideration by the International Labor Organization (ILO) here.

The program, called "Operation Leap Frog," will be functioning next year to assist poorly managed companies to develop regions on a competitive level. The ILO will offer adaptable management development programs capable of use on any service computer in the country.

EDP Systems Managers Told of Opportunities

ANSONIA, Conn. — "One in 10 of today's systems managers could become millionaires by 1975 as proprietors of their own computer service companies. That is not a pipe dream; it is a provable fact," Patrick J. McGovern, president of International Data Corp. and publisher of *Computerworld*, told a recent meeting of the Connecticut Association for Systems Management.

McGovern stated that there are about 28,000 systems managers — the men who run computer installations for large businesses — working today in the U.S.

Between now and 1975, he said, about 2,800 new computer service bureaus will spring up in America, allowing one in 10 of the current number to take over as chief executive officers. "If the business is a small one, worth perhaps \$4 million, and you own a quarter of the stock, you are a millionaire — on paper at least."

McGovern advised the systems people to consider forming a computer service company as a subsidiary of their own present

company.

"Many of you are familiar with the course taken by such firms as General Telephone and Electronics, Louisville-Nashville Railroad, Puritan Fashions, Avco, Westinghouse, and many other major industrial corporations in setting up independent service companies formed around their own DP facilities," he said.

"The chief advantage to you in this arrangement is that your subsidiary company remains under the financial protection and support of your parent company," he said.

"The chief advantage to your parent company is the chance to turn its data processing operation — a cost center now — into a profit center," he added.

If the systems manager cannot convince his present management to set up a computer service bureau as a subsidiary, McGovern said, another course of action "is to form your own computer service company."

"This is a far more risky route," he added, "but if you are exceptionally successful, the rewards can be exceptionally large."

IBM Lands United Air Lines Contract For Computerized Reservations Plan

CHICAGO — IBM has landed a United Air Lines (UAL) contract for a computerized passenger reservations system, confirming an earlier report [CW, April 22].

United said the contract with IBM could involve some \$50 million for IBM equipment and technical services over a period of years.

The new system is expected to begin serving United's reservations offices next spring, the airline said. Initially the system will use 360/65s, which later will be replaced with more powerful 360/195s as they become available, United said.

The equipment will be used for reservations control and the maintenance of passenger name records. The system will employ the IBM Passenger Airline Reservations System (Pars) software

package which is also used by Eastern Airlines.

Denver, which already houses UAL's first-generation Bunker-Ramo "Instamatic" airlines reservations system, will be the national headquarters for the new system. Installation and testing of some equipment will begin in August, concurrent with partial occupancy of the \$5.2 million facility.

Earlier this year, United cancelled a 1965 contract with Sperry Rand for a Univac electronic data system for reservations, stating that the pact called for the system to be operative by June, 1968.

Earlier this month, Sperry Rand announced an apparent "amicable settlement" of the contract. Details weren't announced.

Compdata Formed to Supply SE Service

ARLINGTON, Va. —Auerbach Corp., EDP publisher and information systems architect and consulting firm, has joined forces with Comprehensive Designers, Inc., an organization specializing in engineering and technical services, to form Compdata Services Corp.

The new company's primary business is supplying systems engineering personnel and assistance to various customers on an "as-needed" basis, at lower than the cost of obtaining these same

services directly from hardware manufacturers, the company said.

Compdata Services is headquartered in Arlington, Va., with branch offices throughout the country.

Other New Companies

★ The nucleus of the Exec-8 management and design team has left Univac and formed United Software Corp.

The firm will offer specific services to Exec-8 users as well

as general consulting and system design support.

The firm currently is providing services for three manufacturers, a consulting firm and a common carrier.

A large part of the company's initial business will center on assisting computer users in implementing, planning, and modifying large-systems including demand, multiprogramming, and real time.

United Software is headquartered in Jenkintown, Pa., with branch offices in Ridge-wood, N.J., and Minneapolis, Minn.

★ A new integrated circuit and core memory company called Mnemotek Corp. has been formed in Levittown, Pa.

Mnemotek is currently under contract to supply Nasa with a specialized memory for its requirements. A standard product line of sub-microsecond memories will be announced shortly.

★ A new firm, Satellite Computer Service, has been formed as a service facility in Philadelphia.

Satellite offers computer and programming service to its customers over satellite terminals installed in each firm.

★ Capitol Computer Graphic Systems has been formed in Bethesda, Md., to provide machines and services of computer data input by optical scanning of documents.

DYNAMIC DEBUGGING SYSTEM

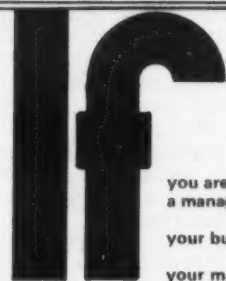
ASYST

- Receives control at program check or external interrupt.
- Operates in full Batch, MPS, or BJT environment.
- User may alter or display any register, storage or PSW.
- Built in Hex address calculator.



INTERNATIONAL LOGIC CORPORATION

BOSTON • SAN FRANCISCO • LOS ANGELES • TOKYO



you are managing a DP operation — or are putting together a management information system . . .

your budget is limited, your staff small, and your computer not a giant . . .

your management needs reports that are based on file information . . .

then — you have problems of creating, maintaining, and retrieving information from files.

These are severe problems when your management needs customized reports quickly but there is no easy way for them to generate their own. You, or your staff, must do this for them. Results? Fair to good, but never 100% satisfying.

Until now there has been no easy answer. FILE EXEC 70 is a system that your managers can learn to use in two days. It is not necessary for them to write programs, but only specify parameters. Users only need to know the external characteristics. As DP manager, you may wish detailed information on internal characteristics of FILE EXEC 70 to evaluate it.

First there is the *System Description* covering characteristics of language types and forms, modes of use, file media, documentation, etc. *Data Structure* includes types of groups, entries, files; and their identifications. *Functions* precisely defines the preceding items and also covers interrogation, selection criteria, file creation, etc. *Storage Structure* specifies storage representation for item levels, entry and group levels, file levels, and multiple files. *Operational Environment* gives details of basic and expanded hardware, software, and systems requirements. Prices are also provided.



Pioneer Data Systems
Suite 308, Merle Hay Tower
Des Moines, Iowa 50310 (515) 276-6746



COMPUTERWORLD

emerging enterprises

KDI Affiliate to Produce Optical Computer Communications Links

CINCINNATI, Ohio — A new company, University Instruments Corp., Boulder, Colo., the outgrowth of an industry/university relationship, has been formed as an affiliate of KDI Corp.

The company is currently readying four products for sale: ion implantation equipment; a line of liquid electro-static high voltage generators; real-time optical spectrometers; and optical computer communications links.

Orders are already being taken for the optical computer communications links for such applications as providing communications between computers and peripheral equipment.

For the past three years, KDI has sponsored basic research at the University of Colorado, in a number of scientific areas. Some of the principle stemming from this research are now being transferred to University Instruments, which will further develop and manufacture the products.

Ridall Associates Offers Consultation Services

PENNSAUKEN, N.J. — Data Systems Analysts, Inc., com-

puter programming and systems design company, has established a federate company, Ridall Associates, Inc.

The new subsidiary will offer consultation services to commercial and industrial clients in the areas of planning and managing computers and management information systems.

The close alliance with Data Systems Analysts establishes capabilities for a full-line service of planning, evaluation, and implementation of computer systems.

Ridall Associates' specific activities and applications will encompass management studies, management information systems, business information systems, technical specifications and evaluation, information storage and retrieval systems, and product and market planning consultation.

Other New Subsidiaries

★ Castle & Cooke Inc. has organized C&C Computer Systems Inc., Portland, Ore., as a wholly owned subsidiary to handle the computer time-sharing and other software operations acquired from EDP Central Inc. of Portland, Ore.

Trade Shorts

Delta Data Systems, a consulting, programming, and systems analysis service, has moved its corporate headquarters from College Park to Kensington, Md.

The Telecontrol division of Vogue Instrument Corp., Richmond Hill, N.Y., has entered into a joint manufacturing and marketing agreement with Applied Data Research Inc., Princeton, N.J., to service the computerized "manufacturing control systems" field, involving the operation and application of factory mass production methods.

United Computing Corp., a developer of proprietary software, has relocated its offices to Carson, Calif., from Redondo Beach.

Less than one year after its introduction, the 100th delivery of the KV Graphics System display option has been made by DEC to the Nuclear Medical Computer Corp., Minneapolis, for use in studying radioactive isotopes.

Societe Internationale de Telecommunications Aeronautiques (Sita) will open a large computer center this summer at Airport Industrial Park, Bohemia.

Sita, based in Paris, operates a worldwide communications network whose 150 centers operate in 85 countries, connected by 263 internationally shared circuits. The network serves 157 airlines, and will be lined to similar centers in London and Paris.

WE DON'T SELL OS/360 — WE JUST TEACH IT . . .

WHEREVER YOU CHOOSE!

It's our job to train your staff in both the limitations and strengths of OS/360. We offer 58 courses and teach at your location and/or ours. If it's an OS/360 subject, we cover it and we would like the chance to do just that for you. Give us a call.

PROGRAMMING • ANALYSIS

PACE

CONSULTING • EDUCATION

Orders and Installations

The Royal Turf of Thailand has ordered a Control Data 3100/3300 interlinked computer system valued at nearly \$1.5 million to process racetrack betting information and calculate dividends on winning tickets. The two computers will communicate with ticket-selling machines at the race track. The Maryland Department of Motor Vehicles has also installed two CDC 3300s.

General Computer Systems, Inc. has received orders for two of its System 2100 computer-controlled keyboard EDP input systems valued at \$276,000. Michigan Blue Shield, Detroit, will take delivery of a 16-station System 2100. Data Overload, Inc., a Los Angeles service bureau operation, will put a 10-station system into operation.

Irving Bank and Trust Co. of Irving, Texas, has installed a Burroughs B3500 to perform accounts payable, accounts receivable, invoicing, labor distribution, general ledger, inventory, sales analysis, cost accounting, production schedules, engineering applications, payroll, installment loans, demand deposit accounting, certificates of deposit, and savings accounting work. Tri-Valley Growers, a San Francisco-based food processing-marketing cooperative, has also installed a B3500.

Vogue Instrument Corp. will deliver high-speed digital printers to the Department of Commerce, Bureau of Census. These printers are to be used to support the bureau's processing activities during this census year 1970.

The following companies have placed orders for the Univac 9000 series computer systems: American Family Life Insurance Co., Austin, Texas; Electronic Computer Programming Institutes in Hartford, Conn., and Grand Rapids, Mich.; McCormick Selph Co., Hollister, Calif.; and Wrexham & East Denbighshire Water Co., England, ordered 9200s; Farmers Mutual Hail Insurance Co., Des Moines, Ohio, North Tonawanda, N.Y. Board of Education, Washtenaw Community College, Ypsilanti, Mich.; and Eddison Plant Ltd., a member of the British Traction group, ordered 9200-1Is; Great Southwest Life Insurance Co., Houston, Texas, Crowley's Milk Co. Inc., and Crown, Cork & Seal Co. Inc. have ordered 9300s; Cortland College, Cortland, N.Y., and Douglas & Lomason, have or-

derd Univac 9300-1Is; Motorists Mutual Insurance Co., Columbus, Ohio, and Crown, Cork, and Seal Co. Inc. ordered 9400s.

Macro Services Corp. of Boston has ordered a \$1.6 million RCA Spectra 70/46 remote computing system to service the firm's six product divisions.

Saint John branch of Thorne, Gunn, Helliwell and Christenson, London, Ohio, has ordered an IBM 360/20 to do accounting reports for the firm's clients, and eventually to operate as a commercial data center.

Contracts

Bowles, Andrews, and Towne, consulting actuaries, have purchased 1,475 portable KeyPact computer terminals from Computone Systems, Inc., Atlanta.

Multiple Access General Computer Corp., Ltd., Ontario, has signed an agreement with Metra International of Paris to lease the Ophelie II Lineal programming package. The system is designed to promote maximum efficiency in complex industrial activities such as refining chemical processing and steel manufacturing operations.

Computer Complex, Inc., Houston, has been awarded a facilities management contract valued in excess of \$1.2 million. Under the terms of the contract with a major U.S. oil company, CC will manage a nation-wide time-shared computer system exclusively for this client.

System Development Corp., (SDC) has been awarded an \$864,000 contract to develop computer programs for the Army's White Sands Missile Range Air Surveillance Systems. The contract awarded by the Electronic Systems Division of the Air Force, calls for modification of the current Back-Up In-

Cegos/Tymshare Opens Center in France

PALO ALTO, Calif. — Cegos/Tymshare has opened its computer center in the Paris suburb of St. Cloud.

The new center houses an XDS 940, identical to those used by Tymshare in the U.S., and associated peripheral gear. Installed earlier this year, the system is now being used to provide commercial time-sharing service to clients in the Paris area.

It is intended as the keystone of a time-sharing service that will be offered throughout France and eventually throughout

Western Europe.

Cegos/Tymshare is a joint venture of Tymshare, Inc., Palo Alto, and two French enter-

quarters.

Automation Technology, Inc. of Champaign, Ill., has moved to new offices and research and development facilities at Number Two Henson Place, Champaign. The new ATI location provides expanded facilities for hardware development and manufacturing as well as office space for ATI research and management personnel.

Rixon Electronics, Inc. has opened its latest sales office at 6200 North Central Expressway, Dallas, Texas. Rixon also has offices in Boston, Houston, Chicago, Los Angeles, and Silver Spring.

Computer Information Management Corp., of Dallas, has expanded operations to include a marketing division, and an education division that will offer courses providing executives with a broad understanding of computer systems and theory, and enable them to obtain maximum productivity in computer utilization.

Data Printer Corp. has opened a West Coast office at 626 West Commonwealth Ave., Fullerton, Calif. Data Printer Corp. is engaged in the manufacturing and sales of medium-speed line printers.

Expansions

prises, Cegos Informatique, a management consulting firm and Credit Lyonnais, a major French bank.

It offers a range of services and products for time-sharing and remote processing use comparable to that available from Tymshare, a large independent company in the U.S.

Other Expansions

Data Instruments Co. has doubled its manufacturing facility with the acquisition of a 19,000-sq-ft building adjacent to its headquarters in Sepulveda, Calif. The new building will provide increased facilities for the production of Dataplex, the company's new data acquisition and data preparation system. The new facility will also house field service, training, and industrial relations departments. The original 18,000-sq-ft building continues as corporate head-

COMPUTER SPEAK WITH FORKED TONGUE.

Because computer fed with forked tape. Tape that contains errors and dropouts.

Kybe Corporation has been making war on these problems for years. Which is why over 70% of the people who maintain tape, rely on Kybe.

Now Kybe has a weapon for even the smallest tape user.

The new Kybe TMS-70. It's a small tabletop cleaner/tester. There are both 7- and 9-track, 800 BPI, 3200 FCI and dual density models that cost a lot less than you'd expect.

The Kybe TMS-70.

It's enough to make your computer straight arrow.



KYBE CORPORATION
132 Calvary Street, Waltham, Mass. 02154
Telephone (617) 899-0012
Offices & representatives worldwide

**UNDER
\$50-K
COM**

2. Will it work with your software?

Any computer output microfilmer that can accept your computer's output without learning a new language has a decided edge over one that cannot.

The PTI 1300 can; it accepts any standard print tape format.
757 North Pastoria Avenue
Sunnyvale, California 94086
(408) 732-4940



**Reduce Your
Computer
Print-Out
to 8½" x 11"**

Xerox copies

\$25. per 1000

Minimum charge \$10

SPEEDY SERVICE

**POWER COMPUTER
SYSTEMS, INC.**

81-3 and Meadow Road, Rutherford, N.J.
N.Y. 07070-2600 • N.J. 201-261-1234

Reeb Appointed Dataram V.P.

PRINCETON, N.J. — Ralph A. Reeb has been appointed administrative vice-president for Dataram Corp., a computer-memory products company.

Reeb will act as liaison between Dataram and the financial world and will carry out corporate development activities and general administrative functions.

Previous experience includes positions with Boenning & Scattergood, Inc., a Philadelphia investment securities firm; and Moore Business Forms, Inc.

FOR SALE REASONABLE PRICE IBM 360-30 32K (2.0 MIC)

- With Decimal Arithmetic
- 1401/1440/1460 Compat Basic
- Under IBM Maintenance

Call or write:
T.S. Kosciuszko
GENERAL RADIO COMPANY
300 Baker Avenue
West Concord, Mass. 01781
Tel. (617) 369-4400

COMPUTERWORLD's Sales Offices

National Sales Manager
Neal Wilder
Sales Administrator:
Dorothy Travis
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

New England Regional Manager
Robert Ziegel
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
(617) 332-5606

Mid. Atlantic Regional Manager
Donald E. Fagan
Phila. — Wash., D.C. District Manager
John Cummings
COMPUTERWORLD
Suite 4C
120 East 34th Street
New York, N.Y. 10016
(212) 532-1790

Midwest Regional Manager
Bill Farrell
Eastern Midwest District Manager
Joe Daniels
COMPUTERWORLD
Suite 218
25 East Chestnut
Chicago, Illinois 60611
(312) 944-5885

Southeast Regional Manager
Ed Graham
COMPUTERWORLD
Stemmons Tower West
2730 Stemmons Freeway
Dallas, Texas 75207
(214) 638-1140

Los Angeles Area:
Bob Byrne
Sherwood/Byrne/Clarkson/
Van & Assoc.
1017 N. LaCienega Blvd.
Los Angeles, Calif. 90069
(213) 657-6221

San Francisco Area:
Bill Healey
Thompson/Healey Assoc.
1111 Hearst Bldg.
San Francisco, Calif. 94103
(415) 382-8547

Japan:
Mr. Naoyoshi Ando
Fuji Corporation
3-1, 5-Chome Yoyogi
Shibuya-Ku
Tokyo, Japan

Buy Sell Swap

NEED A SMALLER UNIT?

NCR — 500 (400 words) —
New Aug. 68 —
Used Very Little —
W. Va. Loc. \$25M
CW BOX 3205
60 Austin Street
Newton, Mass. 02160

SALE

Sanders Data
Display Equipment
(2) 720 Display Terminals
(1) 701 Control Unit
Used only on a test basis
Will Sell June 15
For Highest Offer Received

**TELECOMPUTING
INCORPORATED**
1626 EDISON STREET
DALLAS, TEXAS 75207
(214) 748-0751

FOR SALE AT FRACTION OF ORIGINAL COST

IBM 360 Systems, 7074,
7094, 1401, Univac Systems

EBM COMPANY
625 Bard Ave.
Staten Island, N.Y. 10310
212-273-3636

IBM SALE

024-\$600; 026-\$1800; 056-\$650
077-\$900; 082-\$1000; 083-\$3800
084-\$7500; 108-\$7500; 402-\$2000
403-\$2500; 407-\$7000; 514-\$1900
519-\$2200; 523-\$1100; 632-\$2500
1316 Disk Packs \$150;
2311-\$14,000; 1620/22-\$15,000;
6400-\$14,000
1401/1402-\$24,000

AALL DATA CO.
105 Hinricher
Willow Springs, Ill.
312-839-5164

Available June, 1970

IBM 360 Mod 30 CPU (64K)
Competitive Rates
For 1 to 3 yr. lease

Automated Services, Inc.
P.O. Box 329, Fairview, Oregon
Lou Nelson or J. Poppenheimer
(503) 665-8125

FOR SALE OR LEASE

360/30
1406 II
1401's
7010-1410
2311
1440
729's
**CORPORATE
COMPUTERS, INC.**
120 East 23rd Street
New York, N.Y. 10010
(212) 867-0664

I.B.M.

SALE OR LEASE
024-029-056-059-026
031-077-080-403-552
557-602A

BUY
All I.B.M. Equipment
Field Engineering
Service Available
DP SERVICE INC
5505 N. Menard
Chicago, Illinois 60630
312/774-2556

IBM 1620 SYSTEM

with Floating Point available
in September 1970.
\$12,000 — under IBM main-
tenance.

Write Box 629
Ocean Springs, Miss. 39564.

Honeywell 120 For Sale

\$125,000 24K, 4 Tapes
Printer Reader/Punch
**Carlin-Black-Systems
Corporation**
3376 Peachtree Road
Atlanta, Georgia 30326
404-261-2036

360/40 FOR LEASE 262K-2 channel

Available June/July
Phone 317-631-1311

Jim LeTourneau
Ron Clark

DISK PACKS

For Sale

IBM 1316

\$125 Each

Contact
Lee Parks
The Cross Company
Fraser, Michigan 48026
313/293-3000 X314

IBM 1460

CPU, I/O Controller,
Console Fully Maintained

FOR SALE

Available Immediately
Brokers Invited
Contact: R.H. Hill
Informatics Inc.
(213) 783-7500

DELIVERY TODAY

Model 33 Teletypes available
for immediate delivery. Brand
New — For sale only.

Call 212 868-1610

75 FRIDEN FLEXO WRITERS

1. Five channel tape.
2. Baudot code.
3. Programmable reader and punch station.
4. Tape hard copy combined, input and/or output combination.
5. Meteorological special characters.

CONTACT: B. L. Graubart
312/CE 6-7220

WANTED IMMEDIATELY

To BUY or LEASE

IBM/ 360/65 360-67

Principles:
**MARKETIME
CORPORATION**
2 PENN PLAZA NYC 10001
(212) 736-2430

BUY SELL LEASE TRADE

IBM 1401's, 360's
And Unit Record
Equipment Under
Maintenance Agreement
Substantial Savings

DESI

**Data Equipment And
Supplies Inc.**
5738 N. Central Ex.
Suite 101
Dallas, Texas 75206
214-827-4591

COMPUTER AUCTION

ATTENTION COMPUTER SELLERS!

Sellers of Computer Equip-
ment are invited to partici-
pate in a computer auc-
tion to be held in New York
City on JULY 30, 1970. The
auction is sponsored by **TIME
BROKERS, INC.** — National
Brokers of Computer Time
and Equipment. Auction will
be managed by **PARKE BER-
NET, INC.** — world famous
auctioneers.

For Further Information

Call or Write:
Joe Kirby
TIME BROKERS, INC.

380 Lexington Ave.
New York, N.Y. 10017
(212) 661-7712

COMERICA COMERICA
NOW BUYING
• IBM 082, 083, 047
• 402, 407, 1401 Systems
AND SELLING
• IBM 360/30 64K System
• IBM 360/30 32K System
• IBM 1442-N1 Card Read Punch
• IBM 548, 026, 514
Contact
Bill Oliver (816) 221-0202
COMERICA
COMERICA COMERICA

FOR SALE 1741-1 UARCO

Burster with belt feed se-
quence stacker. 4 years old.
Has been under continuous
service agreement.

Write:
North Central Data Cooperative
P.O. Box 728
Mandan, North Dakota 58554
Or call: Mr. Charles Weekly
Productions Manager
701-663-6511

BUY-SELL-LEASE

**ALL TYPES
DATA
PROCESSING
EQUIPMENT**

COMPUTER DISCOUNT CORP

2400 E. Devon Ave.
Des Plaines, Ill. 60018
(312) 297-3640

FOR SALE UNIVAC FASTRAN II

Mass Storage Drum
and Controller.
Immediate Sale.
John Miller
(412) 683-4220

084 047 088 FOR LEASE — AVAILABLE IMMED. NATIONWIDE DELIVERY UNDER IBM M/A

We are buying unit
record equipment
Data Rentals
3753 Wilshire Blvd.
Los Angeles, Calif.
(213) 385-2484

FOR SALE
HONEYWELL 1250 SYSTEM
H1251-H CPU, 84K CORE,
CONSOLE, 3 DISK DRIVES,
INTERNAL TIMER, COM-
MUNICATIONS CONTROL-
LER, STORAGE PROTEC-
TION, EXTENDED MULTI
PROGRAM.
2 YEARS OLD — 50% OFF
CONTACT MR. RICHARDS
259 ALEXANDER STREET
ROCHESTER, NEW YORK 14607
716 325-3553

Buy Sell Swap**TALLY
MAGNETIC TAPE
TO PAPER TAPE
CONVERSION SYSTEM**

1. Read five level fully perforated paper tape in baudot code at 120 characters per second.
2. Convert five level code to IBM 1401 format.
3. Record converted code on mag tape at 200 bits per inch.
4. Convert 1401 mag tape to paper tape in baudot code at 75 characters per second.

CONTACT: B. L. Graubert
312/CE 6-7220

Time for Sale**NEW YORK**

Tired of Traveling?
Process in Nassau County

360/50

Block Time Available

DATA PREPARATION

256K, (4) 2311, 2495
(6) 9 Track Tape Drives
1100 LPM Printers-UCS
Complete DOS Support

D. Santman
ALPHANUMERIC INC.
Lake Success
516-437-9000

NEW JERSEY**Rent
our brain
child**

360-MOD-50
\$100 per hour

OS/MFTII-DOS

Telecommunications facilities.
Private ready rooms.
Relaxing atmosphere only
50 minutes from New York
or Philadelphia.

Call 609 921-8550, ask for
Bob Perlman
Applied Data Research, Inc.
Princeton, New Jersey

**COMPUTER
TIME
AVAILABLE**

Large Scale
Honeywell 200 System
With paper tape reader
Attractive rates
for all shifts
**Eastern Data
Processing Corp.**
100 Prince St.
Paterson, N.J. 07505
201-274-7230

SUBSCRIBE TO CW

**KEY PUNCH
RENTALS**

029 KEY PUNCHES \$110/mo.
059 VERIFIERS \$115/mo.

Immediate Delivery
Call any of these T&T offices:
Boston: 617-329-3280
Chicago: 312-641-1970
Dallas: 214-742-1171
L.A.: 213-937-1760
Philadelphia: 215-561-3255
Wash., D.C.: 703-525-5940
Baltimore: 301-837-5559
N.Y.: 212-867-5661

TIME BROKERS, INC.**COMPUTER ACQUISITIONS CO.****WANTS**

- COMPUTERS, ALL
MAKES
- UNIT RECORD
EQUIPMENT

(404) 458-4425 • BOX 29185
ATLANTA, GA. 30329

**PDP-10
Time Sharing**

Fortran, Aid, Basic,
Minicomputer Simulation

Call Joel Pratt
609-921-8550

Applied Data Research Inc.**PENNSYLVANIA****COMPUTER TIME
AVAILABLE**

Prime Shift
King of Prussia
Industrial Park
Philadelphia, Pa. Area
IBM 360/40 256K
4 Tapes 8 Drives
2314 OS MFT Available
Contact: William S. Tague
(212) 265-7744

ILLINOIS

IBM 360-40 . . .
1401 1410 Compatibility
O.S. DOS
Key Punching - Programming
COMPUTIME OF CHICAGO
209 WEST JACKSON BLVD
CHICAGO ILL 312 922 6624



Open 24 hrs a day
7 days a week
CHICAGO LOOP

Guaranteed Prime Time

**FOUR
SYSTEMS**

360/30 65K
6 Tapes 4-2311's
360/40 131K
6 Tapes 5-2311
360/40 131K
6 Tapes

2314 A01
Standard IC-6000 with
micro programming
1401/1410/7010:
7044/7094 DOS —
OS—CS/30 CS/40
DATANAMICS
624 S Michigan
Chicago, Ill. 60605
(312)939-1323
VOLUME DISCOUNTS

Software for Sale**datamacs**

The incredible new
test data generator
that completely
revolutionizes the
normal procedure of
creating test data.

**Load and Go
Environment**

Creates all types of files
DISK

- Sequential
- Index Sequential
TAPE

- Variable
- Fixed

Data generated for
each field

- Constant-specific values
- Sequential values
- Random numbers
- Clusters
- Computational
- Mix—All of the above

Write for new 1970 technical
data and operating instructions,
free demonstration and
pricing information.

MOCS

104 Park Towne Place East
Philadelphia, Pa. 19130
215 LO 8-6860

infomacs

The incredible new
report generator and
file creator that
revolutionizes report
writing and live test
file generation.

**Load and Go
Environment****DISK-TAPE**

- Sequential/Isam
Variable/Fixed
- Control card language
- Learned in minutes
- 70% fewer cards than RPG
- Output—Edited Report
—File
- Process—Entire file
—Selective records

Create selective test file
from live data file

- Maximizes testing environment
- Reduces test time

One-Time Reporting

- Produce report instantly
- No more special programming
projects

Write for new 1970 technical
data and operating instructions,
free demonstration and
pricing information.

MOCS

104 Park Towne Place East
Philadelphia, Pa. 19130
215 LO 8-6860

ACCOUNTS PAYABLE

COBOL (Disc/Tape)

- Excellent cash
management capability
- Handles multi-division
companies with only two
easy-to-use input forms
- \$6,000 or \$200/month



URS DATA SCIENCES CO.
1700 South El Camino Real
San Mateo, Ca. 94402
(415) 349-5111

**360 TELEPROCESSING/
CONTROL PROGRAM
DOS - OS**

An On-Line Control Program which
provides you with:

- Terminal and Line Control Support
- Multi-Tasks Application
- Interfaces with ALC & COBOL
Application Programs
- Audit File
- System Recovery

This system is currently in use and
has proven to be highly successful.

**Automated Financial Systems
Incorporated**
One Decker Square
Bala Cynwyd, Pa. 19004

360-30 65K**ALL SHIFTS****CHICAGO AREA****Ken Stapley****312/654-4262****Don't
Install
2260's**

(or any other
key-driven terminal)

without

GRAPHICS

a complete software package

turnkey systems inc.

one eleven east avenue
Norwalk, Connecticut 06851
(203) 838-4581

**BANK MASTER CHARGE
CREDIT CARD PROGRAM
FOR SALE**

Configuration: NCR 315 — 100, 10K,
5 tape, 132 character
printer, MDS input.

Language: NEAT

Program Runs: 8 daily, 5 billing, 2
monthly
Reports: 6 daily, 6 optional
daily, 3 delinquency
reports, billing
reports, merchant
activity reports

Minimum running times with one
masterfile passing daily, audit trails,
batch proof, variable interest rates,
30 — 60 — 90 day charge, descriptive
billing, forms cost low.

Price — negotiable

Contact: Carl E. Mesnig,
Manager, Data Processing
First Agricultural National
Bank of Berkshire County
100 North Street
Pittsfield, Massachusetts
01201
Tel: 413-448-8231

**FINANCIAL
PACKAGES**

Installment Loan System
Mortgage Loan System
Personal Trust Accounting



ALL FOR
DOS360 32K

Financial Systems Consultants

P.O. BOX 1204 / FORT WAYNE, INDIANA 46801
Telephone: 219 / 422 5415

**SALESMAN
WANTED****TOTALTRAN**

... the most success-
ful Disassembler and
Translation package
in the country is look-
ing for salesmen to
follow up hundreds of
leads throughout the
50 states. Our sales-
force cannot handle it
all.

- *LARGE DOLLAR
CONTRACTS
- *LEADS SUPPLIED
- *LIBERAL COMMISSIONS

Call or write:

PETER D. COLGAN, V.P.
**CPU MANAGEMENT
ADVISORY CORP.**
853 Broadway, N.Y. 10003
Phone (212) 777-7722

**PROFESSIONAL BILLING
AND PRACTICE ANALYSIS
PACKAGE (ARS-1)**

An operational service bureau
system consisting of thirty-six
fully documented programs.

Provides doctors, lawyers, and
other professional persons with
a complete billing service, an-
alysis of practice, and cash flow
control. Now being used by
clinics, hospitals, law offices,
and individual practitioners.

Features include:

- automatic pricing
- data bank (3 yrs.)
- 8 1/2 x 11 reports
- flexible annotation of bills
- insurance activity reports
- multi-user capability
- patient numbers — up to 9
alpha-numeric characters
- up to 99 sub-users
- up to 899 charge codes per
sub-user
- zip code addressing

Available in COBOL for IBM
360

For more information:

**ADVANCED COMPUTER
TECHNIQUES Corporation**
45 East Monterey Way
Phoenix, Arizona 85012
Attention: Paul Rosenthal
or call collect (602) 264-1304

437 Madison Avenue
New York, New York 10022
Attention: Oscar Schachter
(212) 421-4688 (call collect)

GENERAL RETRIEVAL SYSTEM

Separately or together, these proven systems easily adapt to most unique applications for retrieval and reporting, file creation and maintenance. Hundreds of user references. 30-day trial offer. Call or write.

Information Science Incorporated
New City, Rockland County, N.Y. 10956
(914) 634-8877

GENERAL MAINTENANCE SYSTEM

INTRODUCING 1130 NOWPOWER

Now, no more waiting for a slow program to finish before you run a quickie. **1130 NOWPOWER**, an exclusive innovation from DMD, lets you interrupt any job—run another—then automatically restores and resumes your original program. Does it economically, too.

Available immediately.

Write Us. Or Phone:
312-748 2900

DMD

data for management decisions, inc.
22335 Governors Hwy.
RICHTON PARK, ILL. 60971

Information Retrieval and File Maintenance

On-line, high-speed.

On-Line Retrievals: Use *and*, *or*, *not*, etc. to compose requests. Answers provided instantly.

On-Line File Maintenance: Change existing records, add new records, directly from on-line terminal.

Variable-Length Records: All records consist of a variable number of variable-length fields.

Display Terminal: Use IBM 2260 display terminals. Other terminals also supported.

Easy to Learn: Non-programmers can learn to use the system in a few minutes.

On-Line Format Specification: Display only the information you really want to see.

Cross Reference: Several files may be stored and cross referenced directly from terminal.

Cross Tabs: Cross tabs and other reports may be requested from terminal.

All of this is available from Computer Corporation of America in 2 models: Model 103 for IBM 360/DOS and Model 104 for IBM 360/OS.

Write us for information. And specify which model you're interested in.

And if you're interested in the batch-processing mode of operation, specify that, too.

Our address is Technology Square, Cambridge, Massachusetts 02139.

Computer Corporation of America

Software for Sale

PRO/TEST

A PROfitable approach to TESTING

- GENERATES ANY FILE IN MINUTES FOR:
 - Program Test
 - System Test
 - Bench Marks
- REPORTS PERMIT TEST DATA MANAGEMENT
- NO PROGRAMMING EXPERIENCE REQUIRED
- LANGUAGE AND PROGRAM INDEPENDENT
- IBM S/360 - OS - DOS/ HONEYWELL
- SATISFIED USERS NATIONWIDE INCLUDE:
 - Major computer manufacturers
 - Leading shipbuilder
 - America's largest group medical plan
 - Firms in banking, insurance and manufacturing

For Information:

SEARCH, INC.

357 E. Center St.
Manchester, Conn.
203-643-1179

SYNERGETICS CORP.

Second Avenue
Northwest Industrial Park
Burlington, Mass.
617-272-3450

QUICKDRAW FLOWCHART SERVICES

Over 1200 installations now rely on automated documentation. Now, get your programming investment protected the modern way.

Get complete cross-references, logic diagnostics and detail flowcharts from your source programs.

Most languages. Inexpensive.

SDC

SOFTWARE DOCUMENTATION CORP.
3550 W. PETERSON / CHICAGO 60645
312/478-8404
27 W. 69TH ST. / NEW YORK N.Y. 10023
212/973-4530

PAYROLL/PERSONNEL ACCOUNTS PAYABLE DOCUMENTATION SYSTEM TEXT EDITOR SYSTEM

Modular/Well-written
Standard 360 COBOL
Easily Maintained
Customized
DOS/OS

PACKAGE SYSTEMS

References
90-Day Guarantee
Implemented/ Tested
Modification Services
Complete Documentation

For details contact
COMM-SCI SYSTEMS CORP.
785 Market Street
San Francisco, Calif. 94103
(415) 392-5379

CDC TO IBM FORTRAN AUTOMATIC CONVERSION

Translates CDC programs into a standard Fortran for 360, IBSYS etc. at a cost of only 10 cents/card.

SOFTWARE STANDARDS

4401 Keswick Road
Baltimore, Md. 21210
301-235-2250

MARGEN™

RCC's Management Report GENerator. Selects, integrates, coordinates data from your existing files into simple, easy-to-read reports in hours, not days!

MARGEN

Satisfies the need for one-time or non-repetitive reports. Shows dramatic time savings on cross-tabulated reports!

MARGEN

For use on IBM and RCA systems. Does not require the creation of intermediate files—any standard file which can be read sequentially can be used with MARGEN!

MARGEN

Easy to use. Even non-DP people can use it. Just lay out the report, punch your program directly from the report form, load and go!

MARGEN

If you're evaluating software programs, write for literature. If your need is immediate, get your decision-makers together and phone right now for an on-site demo. MARGEN will prove itself.

RCC

RANDOLPH COMPUTER CORPORATION

1425 East McMillan St.,
Cincinnati, O. 45206
(513) 961-5400
Offices in principal cities

UNIVAC 1108 BDP Breakthrough!
File Management System for Tape
File Creation, Updating and Reporting
Designed & Implemented by COBOL Experts:

SEIDEL COMPUTER ASSOCIATES
8949 Reseda Blvd., Suite 107
Northridge, Calif. 91324
(213) 349-1345

*ACCOUNTS PAYABLE

*GENERAL LEDGER

*ACCOUNTS RECEIVABLE

*JOB COST



MANUFACTURING MANAGEMENT SCIENCES, INC.

- S/360 - 25 AND UP
- ALL INSTALLED
- WE IMPLEMENT AND MAINTAIN
- WE GUARANTEE

MANUFACTURING MANAGEMENT SCIENCES, INC.
279 CAMBRIDGE ST.
BURLINGTON, MASS.
617-272-2970

SOFTWARE SPECIALISTS

Computer programs are worth cash to the programmer/analyst who has developed a reliable system which is debugged and ready for the market place.

In the last 6 months our company sold 68 packages, worth more than \$250,000 to major companies from coast to coast.

If you have software which can be marketed we will compensate you handsomely.

Call or write for details of our plan.

D.G. Webster, President

Webster Computer Corporation

1 Padanaram Road
Danbury, Connecticut 06810
(203) 744-6500

6K COBOL CROSS-REFERENCE

Now available to 360 DOS users: a 6K COBOL CROSS-REFERENCE that provides a sequential listing of all data-name and literal usage. This program uses a maximum of 25 cylinders of a 2311 or 2314 to handle up to 9,375 entries, approximately 7,500 to 10,000 source cards. Execution time is extremely fast. 6K storage requirement includes foreground save area. Nothing like it.

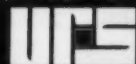
Price: \$200.00

Call or write:

AMERICAN COMPUTER LEASING
ONE EAST FOURTH STREET
CINCINNATI, OHIO 45202
(513) 579-2211

BOND ACCOUNTING & BOND PRICING

- Prepares Securities Subsidiary Ledger
- Prices individual issues
- Produces comprehensive management information
- \$10,000.00 for total package—can be priced separately



URS DATA SCIENCES CO.
1700 So. El Camino Real
San Mateo, Calif. 94402
(415) 349-5111

1130 PLOT

Low cost system plots up to four curves per graph on console typewriter. Special typehead includes 15 dots and 15 crosses positioned in a 3 x 5 raster which yields a plotting precision of about one-thirtieth inch.

- Automatic Scaling and Grid Lines
- Optional Titles and Legend
- Red and Black Points

Call or Write:

TPLOT, Inc.
55 Mitchell Blvd.
San Rafael
California 94903
(415) 472-2211

WHO SAYS PEOPLE
DON'T READ
CLASSIFIED ADS!



FIGHT INFLATION!

Economists tell us inflation is perpetuated by unnecessary expenditures. Writing COBOL without SPEEDBOL is inflationary. SPEEDBOL, our proprietary shorthand system for COBOL, is keeping down the cost of programming and keeping up the pace of installations throughout the country. SPEEDBOL abbreviates the most common COBOL reserved words and lets you abbreviate your own commonly used Data and Procedure Names. Versions now available for IBM System 360 and Honeywell Series 200.

For details write, specifying configuration, to:
PIONEER DATA SCIENCES
P. O. Box 236/Wilbraham, Mass. 01095

360 Payroll System — 100% COBOL —

Series of 23 programs which process hourly and salaried payrolls in a multi-company environment. Liberal deduction capabilities. Full labor distribution reporting. Complete file maintenance facilities. Excellent documentation. Runs on IBM 360 with 32K and two 2311 Disk Drives. This system is now being used and has proven highly successful.

PRICE: \$5,000.

Automated Financial Systems Incorporated
One Decker Square
Bala Cynwyd, Pa. 19004

Eliminate cryptic cobol with — ANCOM's Cobol Documentation System

Converts data element mnemonics to descriptive names

Replaces existing paragraph names with computer generated names that are sequentially related

Presents all programs in a standard format

Produces alphabetical Data Name and Paragraph Name Cross References

Requires 32K, 3 storage devices, \$1,500 or lease

ancom systems

9841 Airport Blvd.
Los Angeles, Calif. 90045

June 3, 1970

Page 39

Beleaguered Analysts Get Help

PORTLAND, Ore. — A financial information system to provide instant investment information for securities analysts, investment portfolio managers, and institutional investors has been developed by Information Sciences, Inc. (ISI), a developer of computer-based management information systems.

The system, called Program Image, is designed around a Digital Equipment Corp. PDP-10/50 computer. Remote desktop graphic terminals provide the financial community with access to the computer and such data as market price, volume, earnings reports, balance sheets, insider trading reports, and trade-by-trade action of any one of the 4,000 stocks traded on the major stock exchanges.

Program Image is designed for use by the non-technically oriented. The user inserts English-like statements in the terminal and receives the requested information in either graphic or written report format.

"We have developed this system for the financial manager who is required to search out and study a vast amount of financial-related data and then is forced to rely on a computer programmer to successfully prepare this data for processing by a computer," said Thomas W. MacLean Jr., ISI president.

Program Image's information is updated continuously through a direct link with the trading floors of both the New York and American Stock Exchanges. Updated information includes each individual transaction in a particular stock or fundamental information, such as balance sheet items concerning a company for the past five years.

The system manipulates data through such processes as exponential smoothing, moving averages, trend lines, ratios and differences, statistically adding new dimensions to already stored information. The user can graphically compare up to three discrete information elements such as stock price, trade volume, and various economic indicators on one graph for more meaningful information.

Users of the system can extract data from any of five data bases. They can select particular stocks or economic indicators that are of interest and also the time sequence that is most meaningful to their needs.

Price of Program Image is \$5,000/mo which includes the alphanumeric console for permanent access to the computer during all operational hours.

Hewlett-Packard Earnings Even On 15% Rise in 6-Month Sales

PALO ALTO, Calif. — Hewlett-Packard Co., maker of instruments and minicomputers, has reported even earnings on a 15% rise in sales for the six months ended April 30.

The company reported sales of \$174 million compared to \$152 million for the same period in 1969.

Net earnings amounted to \$11,704,000, equal to 46 cents a share. This compares with earnings of \$11,688,000, equal to 46 cents a share, during the first half of last year.

President William R. Hewlett noted that 1969 figures relating to per-share earnings have been restated to reflect the company's two-for-one stock split that occurred Feb. 25, 1970.

Hewlett said incoming orders for the first half totaled \$174,046,000, a 6% gain over the corresponding period last year.

"Our sales and orders, although up from the first half of 1969, fell considerably below anticipated levels. As a consequence, we had a 3% decline in earnings during the second quarter. Earnings amounted to \$6,148,000, or 24 cents a share, compared with earnings of \$6,346,000, or 25

cents a share, during the corresponding quarter last year.

"Sales for the quarter totaled \$91,698,000, up 14% over a year ago, while incoming orders were \$86,865,000, down 1% from 1969's second quarter."

Hewlett said HP's domestic business "has been particularly soft, reflecting continuing uncertainties in the nation's economic climate and major cuts in U.S. government spending."

"During the first half, our domestic orders totaled \$106,927,000, declining 6% from a year ago. It is encouraging to note, however, that international orders were up 31% to a record first-half level of \$67,119,000. Our international business now represents 39% of the corporate total, and we expect this share to increase with the continuing expansion of our overseas markets."

UPI Installs RCA Systems To Speed Market Reports

CHERRY HILL, N.J. — United Press International is installing two RCA Spectra 70/45 computer systems, valued at \$1.5 million, at its New York headquarters to provide its newspaper clientele with updated stock market reports ready for immediate high-speed typesetting throughout the trading day, according to J.W. Rooney, division vice-president, marketing, RCA Computer Systems Division.

Within seconds after the stocks are traded on the New York Exchanges, stock market reports, carried over the worldwide wires of UPI, will be delivered to newspaper offices located in four continents.

This improved UPI service, made possible by upgrading from second to third generation computers, is, in addition to news, sports, and racing results,

currently being furnished by UPI wires to some 900 newspapers across the land.

In addition to speeding the updating of stock transaction data, the two new RCA computer systems will automatically hyphenate and justify lines of news text and sports statistical material for delivery to UPI's subscribers.

The updated, edited and formatted stock market data is transmitted to UPI's newspaper subscribers where it is received in the form of punched paper tape. The tape is fed into automated composition equipment.

The UPI stock information will be transmitted several times daily giving latest highs and lows, most active stocks, and total shares traded and other pertinent information for the New York and American Stock Exchanges and the Over the Counter Market.

Redcor to Pay Shares for Penta Assets

WOODLAND HILLS, Calif. — The boards of Redcor Corp. and Penta Computer Associates, Inc. have agreed in principle for Redcor to acquire Penta on a pooling-of-interests basis.

The agreement calls for Redcor to pay a minimum of 300,000 shares of its stock for the assets of Penta. The price may rise as much as an additional 250,000 shares depending on sales of Penta's Keylogic systems.

\$3 Million Deal

Based on a recent \$7 price for a share of Redcor stock, the transaction would be valued at \$2.1 million with an additional value of \$1.75 million for the contingent shares. The acquisition is subject to a definitive

agreement and approval of Penta shareholders.

Public shareholders of Penta would receive .6 share of Redcor for each share of Penta. There are 175,000 shares of Penta publicly held, which accounts for 106,260 Redcor shares. The remaining 193,740 Redcor shares would be distributed to other Penta shareholders, as would the 250,000 contingent shares.

If all the contingent shares were earned, Redcor would swap 550,000 of its shares for the 905,500 outstanding Penta shares.

While Redcor Chairman Emil R. Borgers was "quite positive" about the long-term effect of the merger, he admitted that in the short term it would dilute Red-

cor's earnings because of elimination of intercompany sales and pooling factors.

Borgers said the merger would help Redcor become a significant factor in the data entry field.

Com-Share Gets Extension on Debenture

ANN ARBOR, Mich. — Com-Share, Inc., cash-poor time-sharing company, has revealed that it has obtained a one-year extension on payment of a \$500,000 debenture.

Weyerhaeuser Co., the debenture holder, has moved the due date back to May 31, 1971. The note had been overdue since Feb. 28. At that time Com-Share President Robert F. Guise admitted that the firm needed fresh capital desperately.

Guise now predicts, though, that his company will show a profit by the end of the year. "We have some cash problems but we are not by any means collapsing," he noted.

In February, Guise had said that Com-Share would be profitable in March. He later said that the prediction did not come true "basically because of the economic crunch."

The company is also following up negotiations for refinancing from other sources. In April, a Com-Share spokesman said that the company was talking with a "prominent investment banker" on a new financing plan. At that time Guise said that plans involved a new loan and a purchase-leaseback arrangement.

Com-Share recently renewed a \$150,000 contract with Union Carbide Co. to provide time-sharing services for one year for the chemical company's Oak

Ridge, Tenn., operations. Union Carbide is the prime contractor for the Atomic Energy Commission at the Oak Ridge Laboratories.

Computer Complex 6-Month Report Shows Record Income, With a Loss

HOUSTON, Texas — Computer Complex, Inc. has reported record income for the first six months of fiscal 1970, but will show a loss for the period, President Robert A. Westerhouse has announced.

During the first half of the current fiscal year the firm had operating revenues of \$2,139,545. This compares with revenues of \$643,777 for the same period in fiscal 1969, and revenues of \$2,007,153 for all of fiscal 1969.

Net loss for the 1970 six-month period was \$521,481, or 38 cents per share, compared with a net loss of \$881,007, or 93 cents per share, in the first half of fiscal 1969.

Westerhouse attributed the progress of the company to both innovations and greater efficiencies effected. "In the last

six months, the time-sharing operating made great strides, both in sales and technical capabilities. We are now utilizing our own operating system developed by our research and development staff, and currently are providing time-sharing service for over 200 companies," he said.

Communications Logic, Inc. has introduced several new data communications products.

Correction

On May 20 *Computerworld* reported that Control Data would soon begin shipping the 7600 computer. So far CDC has already installed three of the machines. CDC Chairman William C. Norris said that the 7600 is 18 months away from quantity shipments.

DEC Kills Plans for Stock Offering, Cites Contrary Market Conditions

MAYNARD, Mass. — Digital Equipment Corp. has canceled plans for a new stock offering that industry sources say was supposed to raise \$25 million for the minicomputer maker.

A DEC spokesman said that the offering was dropped because of unfavorable market conditions, and that the company "can take care of its financial requirements with available lines of credit."

Rumors Debunked

The spokesman also debunked Street rumors that DEC was shutting down plants and laying off workers. He said DEC

doesn't plan any layoffs or shutdowns "for the foreseeable future" and labeled the rumor "absolutely false."

Until now DEC has been relatively untroubled by the recession. The company's third quarter report, issued at the end of April, showed sales up 60% and earnings up 86% to record levels. At that time DEC President Kenneth H. Olsen said the company was contemplating additional financing.

When the offering was first proposed, DEC shares were selling for about \$92. Since then the price has dropped to the high fifties.


Behind in Computerworld reading again, Charlie?



Get your own copy. Subscribe.

If you're one of those people who waits his weekly trip for the office copy of *Computerworld*, you're defeating our whole purpose in life. We do not want *Computerworld* to be a timeless reference dictionary. On the contrary, we've developed it to be the fastest, most informative news vehicle in the entire computer field. In fact, we're the only weekly publication in our field. And our subscribers pay us to keep them up to date with the latest industry news, financial news... but you know that already. After all, you're reading *Computerworld* right now.

If this isn't your personal copy of *Computerworld*, spring for the 17.3¢ we charge per issue. You'll get a wide-awake view of what's happening in the computer world, as it happens.

| | | | |
|---|--|--|--|
|  COMPUTERWORLD <small>THE NEWSLETTER FOR THE COMPUTER COMMUNITY</small> <small>5075 AUSTIN STREET, NEWTON, MASSACHUSETTS 02459 • TELEPHONE: 617/552-8800</small> | | Please Circle 1 Number and 1 Letter: | |
| Yes, please send me <i>COMPUTERWORLD</i> for... Add \$1.00 per year for Canada; \$4.50 for Foreign. <input type="checkbox"/> 1 Year \$ 9.00 <input type="checkbox"/> 3 Years \$20.00 <input type="checkbox"/> Bill Me <input type="checkbox"/> Payment Enclosed | | YOUR TITLE AND/OR FUNCTION? A. Operational Management (nonengineering) B. Computer Professional Staff C. Corporate Officers D. Engineering Management E. Engineering/Scientific F. Production/Maintenance G. Sales/Marketing H. Other _____ | |
| COMPANY BUSINESS: 1. Mining or Construction 2. Manufacturer/Computer or Data System 3. Manufacturer/Other 4. Utility 5. Wholesale/Retail 6. Finance 7. Consultants/DP Services 8. Business Service (except DP) 9. Educational/Medical/Legal 10. Government/Military 11. Other _____ | | | |
| Name <input type="text"/> 31 <input type="text"/> 48 <input type="text"/> 70 Your Title <input type="text"/> 48 <input type="text"/> 55 Co. Name <input type="text"/> 57 <input type="text"/> 70 Address <input type="text"/> 55 <input type="text"/> 37 City <input type="text"/> 38 <input type="text"/> 51 52 53 2 3 STATE Zip Code <input type="text"/> 4 <input type="text"/> 8 7 8 7 5 <input type="text"/> 15 16 <input type="text"/> 17 18 19 20 21 22 23 24 25 26 27 Return to: COMPUTERWORLD 69 Austin Street, Newton, Mass. 02160 | | | |

Honeywell Sees Gold in GE's Computer Operations

By Michael Merritt

CW Staff Writer

Playing matchmaker for computer companies is a favorite pastime of idle programmers (programmers who aren't thinking at the time). But seeing two of the big boys actually getting together is a small glimpse of paradise for armchair empire builders. And the current merger attempt of GE and Honeywell provides more diversion than a new chess program on a 195.

First of all, why should Honeywell want GE? The lightbulb maker has been trying to turn a profit in computers for more than a decade, and failed. And there are lots of other companies who have found that making money from computers is duck soup.

But making and selling computers isn't like turning out light bulbs or gas turbines. It's a special selling situation and a special R&D situation.

Word has it that a GE study showed it would cost the company a billion dollars over the next five years to prepare for effective competition against IBM's new generation. And apparently the GE board decided it could use the money better elsewhere.

No one outside of GE is sure how much the company has spent on computers, but the prospects of throwing another billion down the drain just to turn a profit must have upset a number of corporate stomachs.

GE to Benefit

So GE should come out of the deal fairly well. First it will own about 9% of Honeywell, thus becoming its largest shareholder. In addition it will receive \$110 million in Honeywell notes — not much for a fish the size of GE, but a nice swap for a money loser.

Responsibility for running the computer division will not belong to GE so that management can spend more time on toasters and jet engines. And it will still retain an 18.5% interest in what should work out to be a very interesting computer company.

On pages 8 and 9 of this issue Donald Leavitt and Frank Piasta write about possible hardware and software lines of the new company. It's obvious that there are many areas where merging the product lines will strengthen the new company.

But from the point of view of a Honeywell salesman, once the operation is sorted out and

somebody decides which products the new company will peddle, the merger is like money in the bank.

News Analysis

He's now going to have the best of two possible worlds with which to work. And, maybe most important, his customer base is going to double. Twice as many people to talk into upgrades — paradise!... and good time-sharing equipment options — double paradise!

Sales Skill

Even if Honeywell is buying a profitless dog, there is still gold in the pile of GE slag. One of Honeywell's great strengths is a sharp aggressive marketing force, which will now have an expanded product line and a doubled customer list.

Honeywell could probably make money out of that if it had to sell petunias. Next, the company is doubling its assets just before IBM comes out with a new generation of machines — just when the competition is really going to get tough again.

And GE's R&D and manufacturing abilities are not negligible.

Profit Base

Finally, that profitless dog may have more bite left than many people realize. GE has \$1.3 billion of equipment in the field. If we assume that about 75% of it is on rental, that means that there is a potential profit base of \$975 million of equipment. The 200 line is now profitable, and others may also be soon.

The Bull-GE companies showed a negligible profit last year, but this is probably an indication that they have turned the corner to becoming real money-makers. The other European subsidiaries are operating in the black. With judicious pruning, GE's computer operations might be milked for a good deal of money.

European Market

Incidentally, as the recession drives more and more salesmen to the "funny farm," computer companies are increasingly interested in the European market, which is now booming the way the U.S. market was a few years ago. In the European market, Honeywell by itself is approximately nowhere. Including its Bull and Olivetti acquisitions, GE has about 8% of the European market, while Honeywell has about 2.75%. Together, then, they would have a larger percentage of the richer European market than they would of the U.S. market.

A word about earnings. The

figure of 81.5% isn't happenstance. At over 80% ownership, Honeywell can consolidate the operations of the new subsidiary into its own balance sheet. While Honeywell's computer operations may grow about 30% this year, the rest of the company could hope for about 5% at most. In what is still a growth-oriented stock market, Honeywell would never lose its only fast-growing segment.

If the deal goes through there will be an immediate 9% dilution because of GE's 1.5 million new Honeywell shares. Honeywell Chairman James H. Binger has said that the plan "was structured with the intention that no dilution in Honeywell earnings per share would result."

This means that to keep earn-

ings per share the same as last year, profits from the computer operations seem to Binger likely to grow about 10%; to keep up the current growth rate Honeywell will have to jump nearly 40%.

So it seems that GE and Honeywell management have decided either that Honeywell is going to have a fantastic year, absorbing GE's losses and still forging ahead, or that the GE operations are going to turn profitable. And the chances of Honeywell profits growing 40% to 50% aren't that hot.

It seems unavoidable to conclude that the GE computer operations are soon finally going to be making money.

Justice and the IRS willing, it should be a fine little company.

360 COBOL (Disk/Tape)

PRODUCTION-ORIENTED PAYROLL SYSTEM

Series of 30 Cobol Programs and JCL Sorts using 32K system. Multi-company capability including split earnings between two companies. Incentive, salary and special executive payroll processing. Systems includes file maintenance, payroll processing, deduction register, cost report by unit, labor distribution, check reconciliation, quarterly and year-end reports. System is now being used successfully.

All Versions \$5,000.

For further details and modification inquiries, contact:
K-L Programming Services, P.O. Box 3862
Akers Shopping Center Station, Gastonia, N.C. 28052

Position

Announcements

INSTRUCTORS

Teach unit record operation/wiring FORTRAN, COBOL, assemblers, systems. Degree plus experience. Equal opportunity employer. Brief resume to Wayne Laurents, St. Petersburg Junior College, Clearwater, Fl. 33515

NCR 315 NEAT EXPERIENCED PROGRAMMER

Magnetic tape and banking experience preferred. Relocate in Palm Beach County, Fla. Salary and relocation costs open.

American Bancservice Corp.
P.O. Box 1128
Lake Worth, Fla. 33460
(305) 582-3312

NEW YORK SALES REP

Independent salesman, 10 yrs. experience, hardware/software offers services to organizations seeking start-up, test-market or part-time qualified representation. Short-term agreements will be considered on per diem or commission against draw.

For immediate response contact:
CW Box No. 3203
60 Austin St.
Newtonville, Mass. 02160

BRANCH SALES MANAGERS

Computer Peripheral Equipment CHICAGO & DETROIT

Our rapid and sustained growth as a leader in the design and manufacture of digital computer peripheral equipment has created the necessity for broadening our traditional OEM market to encompass the entire data processing end-user community. This national expansion has created immediate career openings in our Chicago and Detroit branch offices.

The successful candidates will have 3-5 years of proven sales experience to end-users in the data processing field. Familiarity with 360 systems is desirable. A degree is preferred but not essential. Excellent salary, incentive and outstanding benefits including profit sharing.

If you would welcome an association with a company whose products, facilities and widening markets will further your own professional goals, please forward resume including salary history and requirements in confidence to, Mr. L. E. Henry, Professional Employment.



POTTER
INSTRUMENT CO. INC.

EXECUTIVE DRIVE, PLAINVIEW, NEW YORK 11803

An equal opportunity employer

New Registrations

BUSINESS COMPUTERS INC., 10844 Shady Trail, Dallas, a company engaged in the business of buying and selling used data processing equipment, both for its own account and as broker for others, filed to register 200,000 shares of common stock. Proceeds, at \$7.50 per share maximum, intended to be used to pay short-term indebtedness and to be added to working capital and used to purchase additional equipment for resale or lease. The underwriter is Provident Securities, Inc.

NEEDED NOW! MARKETING CONSULTANTS

Openings now exist for marketing representatives who have sufficient EDP experience to act as consultants to users. This is an exciting new concept in the software field by people with marketing background. We provide training material and leads. Excellent commission plan. May be handled on a part time basis. Send resume in confidence to:

Software Marketing Inc.
Suite 214 500 Newport Center Dr.
Newport Beach, Calif. 92660

*it looks wrong
but it comes out right
for Lockheed*

| | |
|--------------|------------|
| EDP Overtime | 36% - |
| EDP Staffing | 10% - |
| Late Reports | 57% - |
| | \$ 250,000 |
| | \$ 250,000 |

*\$250,000 Savings using the DEADLINE! Computer Center Planning and Scheduling System.

Late EDP reports, backed-up schedules, and reshuffling of job assignments is a costly proposition. The DEADLINE! software package provides Lockheed-Georgia with a way of scheduling its entire EDP center according to Lockheed's own priorities with efficient time use. Annual cost savings are estimated at \$250,000... in the data center alone. For savings in any size EDP center, contact: Director of Marketing, Synergistic Cybernetics, Inc., 7777 Leesburg Pike, Falls Church, Va. 22043. Phone: (703) 821-2500.

SCI

SYNERGISTIC
CYBERNETICS
INCORPORATED

The Computer Industry in the 1970s

During 1969, U.S. companies chalked up over \$10 billion in revenues from their computer industry activities... ten times the corresponding figure for 1960. In 1974, revenues of some \$25 billion are expected.

That's how EDP Industry Report describes the decade just past in its special Review and Forecast issue, just published.

This Review and Forecast issue contains a revenue history and projection for the key sectors of the EDP industry... five-year shipment projections... and capsule analyses of IBM and the other major computer manufacturers.

This one issue will go a long way toward bringing you up to date on the computer industry. It is one of the twenty-four issues published throughout the year and is available for \$10, or as a free bonus with your subscription — \$75 per year. Write:

EDIP industry report

Department RF
60 Austin Street
Newtonville, Mass. 02160
617-969-4020

Farrington Considers Selling Operations

SPRINGFIELD, Va. — Farrington Manufacturing Co., one of the leading makers of optical scanning equipment, has been told by its auditors that the company's 1969 losses will be about twice as much as the company has reported. This brings the estimate up to about \$5 million.

As a result, Farrington is exploring the possibility of selling part or all of its operations.

The final auditor's report won't be in until June 15. A company spokesman revealed, however, its auditors have already said that inventory values and contingency reserves will have to be adjusted, doubling the company's loss.

A spokesman for the OCR firm said there have been meetings with long-term debt holders, and

that the firm has retained the investment banking house of Drexel Harriman Ripley, Inc. to find a buyer for the company's operations.

In 1969 the company had sales of about \$33 million, up from 1968's \$30.6 million.

The holders of Farrington's \$3.7 million debentures have granted the company payment extensions since the beginning of April.

When Farrington first announced that it expected a sizeable loss, it laid the cause "principally... [to] significant inventory adjustments and differences revealed during the year end financial closing now being audited."

The company added that it had begun to use a new computerized inventory accounting system and that it was trying to discover the causes of "the inventory discrepancies."

Acquisitions

The American Tabulating Co., Englewood Cliffs, N.J. has acquired Cybergraphic Systems and Programming Corp., Hackensack, N.J. The merged firm, American Tabulating and Cybergraphic Co. offers complete data processing services to industries, municipalities, hospital and medical groups, unions, trade associations, country clubs, and restaurants. Terms of the merger were not disclosed.

Datamation Services, Inc., has concluded the sale of Computer Systems and Education Corp. to Northeast Computer Systems,

Inc., Hartford, Conn. NCS has purchased from Datamation all the issued and outstanding capital stock of CSEC for an undisclosed sum.

University Computing Co. has acquired Computer Composition Co., a Dallas graphic arts service specializing in computerized typesetting for an undisclosed amount.

International Industries, Inc., Beverly Hills, Calif., and RB Industries, Inc., Gardena, Calif., terminated their merger agreement, as a result of market conditions.



Fussy, she ain't.

Vista makes it big with any mini-computer.

Vista is an alphanumeric display terminal that's fast, silent, easy to read. Far more efficient than her ancestor, the KSR-33 teletype. And completely compatible with whatever mini-computer you're using.

A completely self-contained, stand alone unit, Vista comes with keyboard, video presentation, control and refresh electronics, data phone interface and power supply. All keyboard operations, including cursor movement, are transmitted and received permitting software editing. Standard interfaces connect to modems up to 1800 baud. Parallel and current loop interfaces are available as options. Vista is available for immediate delivery, for as little as \$1495.00. For further details, write for our free brochure or call.

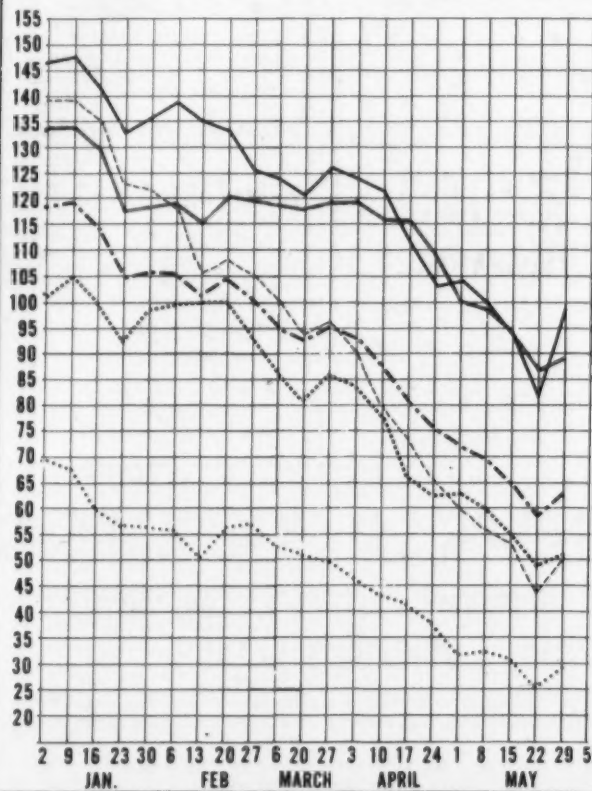


Infoton

Infoton Incorporated, Second Avenue, Burlington, Massachusetts 01803 (617) 272-6660
560 San Antonio Road, Palo Alto, California 94306 (415) 493-0615

Computer Stocks Trading Index

— Computer Systems - - - - Software & EDP Services
..... Peripherals & Subsystems Leasing Companies
— Supplies & Accessories - - - - CW Composite Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

AgriBusiness Opportunity

Exclusive State licenses available for the AgData Agriculture and AgriBusiness computer programs. Covers all management, financial and payroll accounting. Copyrighted input package included.

Write: AgData, Inc.
P.O. Box 1077
Davis, Calif. 95616

360 INTERFACE PROBLEMS?

The Capital CAM/360-2 Channel Access Module simplifies the task of attaching any 8- or 16-bit parallel device to any channel of any 360, models 30 to 195. Speeds to 1 Megabyte. For information, write or call

CAPITAL COMPUTER CORPORATION
18 Mackoil Dayton, O. 45403
(513) 253-6622

Computerworld Stock Trading Summary

NEW YORK AND AMERICAN STOCK EXCHANGE CLOSING PRICES, FRIDAY, MAY 29;
OVER THE COUNTER AND NATIONAL STOCK EXCHANGE, THURSDAY, MAY 28

SUPPLIES & ACCESSORIES

| EXCH | 1970 RANGE | CLOSING PRICE | WEEK NET CHANGE | WEEK PERCENT CHANGE |
|------|---------------|------------------|-----------------------|---------------------------|
| N | 15- 8 | 10 1/2 | ADAMS-MILLIS CORP | + 1 3/8 + 15.07 |
| O | 21- 12 | 12 1/2 | BALTIMORE BUS FORM | - 1 1/2 - 10.71 |
| A | 25- 7 | 3 3/8 | BARRY WRIGHT | + 1 1/4 + 15.38 |
| A | 35- 17 | 19 1/4 | DATA DOCUMENTS | - 1/2 - 2.53 |
| N | 19- 12 | 13 | ENNIS BUS. FORMS | + 1/2 + 4.00 |
| O | 17- 8 | 5 | GRAPHIC CONTROLSCORP | ----- |
| N | 166- 63 | 76 | MEMOREX | + 8 3/4 + 13.01 |
| N | 114- 77 | 84 1/2 | 3M COMPANY | + 1 + 1.20 |
| O | 38- 29 | 30 3/8 | MOORE BUS FORMS | + 1/8 + 0.41 |
| N | 43- 21 | 24 1/2 | NASHUA CORP. | + 3 + 13.95 |
| O | 48- 30 | 30 1/2 | REYNOLDS & REYNOLD | - 1 1/2 - 4.69 |
| C | 30- 21 | 23 3/4 | STANDARD REGISTER | + 1 1/4 + 5.56 |
| N | 39- 25 | 26 3/8 | UARCO | + 3/4 + 2.93 |
| A | 30- 8 | 10 3/8 | WABASH MAGNETICS | + 1 1/2 + 16.90 |
| O | 41- 25 | 26 | WALLACE BUS FORMS | - 4 3/4 - 15.45 |

COMPUTER SYSTEMS

| EXCH | 1970 RANGE | CLOSING PRICE | WEEK NET CHANGE | WEEK PERCENT CHANGE |
|------|---------------|------------------|-----------------------|---------------------------|
| N | 172-100 | 122 | BURROUGHS CORP | +18 1/2 + 17.87 |
| N | 37- 14 | 17 1/4 | COLLINS RADIO | + 3/8 + 2.22 |
| N | 122- 35 | 38 1/8 | CONTROL DATA CORP | + 1 + 2.69 |
| A | 124- 57 | 68 1/2 | DIGITAL EQUIPMENT | + 6 7/8 + 11.16 |
| N | 11- 4 | 5 5/8 | ELECTRONIC ASSOC. | + 3/4 + 15.88 |
| A | 14- 3 | 4 7/8 | ELECTRONIC ENGINEER | - 1/8 - 2.50 |
| N | 39- 22 | 25 | FOXBORO | ----- |
| C | 42- 12 | 12 3/4 | GENERAL AUTOMATION | - 1 - 7.27 |
| N | 77- 50 | 56 3/8 | GENERAL ELECTRIC | + 2 5/8 + 4.12 |
| N | 45- 26 | 28 7/8 | HEWLETT-PACKARD CO | + 1 1/4 + 4.52 |
| N | 152- 82 | 88 5/8 | HONEYWELL INC | + 1 3/4 + 2.01 |
| N | 387-237 | 278 1/4 | IBM | +30 1/4 + 12.20 |
| N | 86- 48 | 56 | NCR | + 4 + 7.69 |
| N | 34- 20 | 23 3/8 | RCA | + 2 3/8 + 11.31 |
| N | 33- 16 | 20 | RAYTHEON CO | + 1 1/2 + 8.11 |
| O | 8- 2 | 3 | SCI. CONTROL CORP. | + 1/4 + 9.09 |
| N | 40- 24 | 28 3/4 | SPERRY RAND | + 3 + 11.65 |
| A | 40- 14 | 17 1/8 | SYSTEMS ENG. LABS | - 5/8 - 3.52 |
| N | 29- 12 | 15 7/8 | VARIAN ASSOCIATES | + 1 + 6.72 |
| A | 51- 21 | 23 1/2 | WANG LABS. | + 3/4 + 3.30 |
| N | 115- 70 | 82 | XEROX CORP | + 6 1/4 + 8.25 |

LEASING COMPANIES

| EXCH | 1970 RANGE | CLOSING PRICE | WEEK NET CHANGE | WEEK PERCENT CHANGE |
|------|---------------|------------------|-----------------------|---------------------------|
| O | 9- 4 | 4 7/8 | BANISTER CONTIN | ----- |
| O | 25- 17 | 12 1/2 | BOOTH COMPUTER | - 1 1/2 - 10.71 |
| O | 8- 3 | 4 1/4 | BRESNAHAN COMP. | + 1/8 + 3.03 |
| O | 8- 2 | 2 1/2 | COMPUTER EXCHANGE | - 3/4 - 23.08 |
| O | 18- 4 | 5 1/4 | COMPUTER LEASING | ----- |
| O | 15- 2 | 2 3/4 | CYBER-TRONICS | - 1/4 - 8.33 |
| N | 37- 6 | 9 | DATA PROC. F & G | + 1 1/8 + 14.29 |
| O | 8- 3 | 3 | DATRONIC RENTAL | - 1 1/4 - 29.41 |
| A | 24- 10 | 12 3/4 | DEARBORN COMPUTER | + 2 1/8 + 20.00 |
| O | 8- 4 | 4 1/4 | DIFORD COMP. LEAS. | - 1/4 - 5.56 |
| A | 10- 3 | 4 1/2 | DPA, INC. | + 1/4 + 5.88 |
| A | 22- 7 | 9 3/8 | GRANITE MGT | ----- |
| A | 44- 5 | 7 5/8 | GREYHOUND COMPUTER | + 1 1/8 + 17.31 |
| N | 30- 7 | 11 3/8 | LEASCO DATA PROC. | + 2 3/4 + 31.88 |
| O | 5- 2 | 2 5/8 | LECTRO COMP LEAS | + 1/4 + 10.53 |
| A | 19- 3 | 6 5/8 | LEVIN-TOWNSEND CMP | + 3 1/2 + 112.00 |
| O | 3- 1 | 1 3/4 | LMC DATA, INC. | ----- |
| O | 4- 1 | 1 7/8 | MANAGEMENT ASSIST | - 1/8 - 6.25 |
| O | 8- 3 | 4 5/8 | NCC LEASING | - 5/8 - 11.90 |
| O | 8- 3 | 3 1/4 | SYSTEM CAPITAL | - 1/4 - 7.14 |
| A | 19- 9 | 12 7/8 | U.S. LEASING | + 2 1/4 + 21.18 |

PERIPHERALS & SUBSYSTEMS

| EXCH | 1970 RANGE | CLOSING PRICE | WEEK NET CHANGE | WEEK PERCENT CHANGE |
|------|---------------|------------------|-----------------------|---------------------------|
| N | 62- 24 | 27 1/2 | ADDRESSOGRAPH-MULT | + 1 1/2 + 5.77 |
| O | 15- 2 | 3 5/8 | ALPHANUMERIC | - 1/4 - 6.45 |
| N | 48- 13 | 18 1/2 | AMPEX CORP | + 2 1/2 + 15.62 |
| A | 34- 5 | 8 1/4 | ASTRODATA | + 1 3/4 + 26.92 |
| O | 11- 5 | 6 1/2 | BOLT, BERANEK & NEW | - 1/4 - 3.70 |
| N | 14- 6 | 8 1/8 | BUNKER-RAMO | + 1 + 14.04 |
| A | 33- 13 | 15 5/8 | CALCOMP | + 3/8 + 2.46 |
| O | 13- 4 | 6 | COGNITRONICS | - 1/2 - 7.69 |
| O | 12- 5 | 6 | COLORADO INST. | + 1/4 + 4.35 |
| C | 36- 8 | 8 | COMPUTER COMMUN. | - 3 - 27.27 |
| A | 17- 3 | 5 5/8 | COMPUTER EQUIPMENT | + 1 7/8 + 50.00 |
| A | 28- 13 | 17 1/2 | COMPUTEST | + 2 1/4 + 14.75 |
| A | 25- 7 | 10 1/2 | DATA PRODUCTS CORP | + 2 1/2 + 31.25 |
| O | 23- 6 | 7 | DATA TECHNOLOGY | - 1/2 - 6.67 |
| O | 13- 5 | 5 3/4 | DIGITRONICS | + 1/4 + 4.55 |
| N | 40- 11 | 17 1/2 | ELECTRONIC M & M | + 5 5/8 + 47.37 |
| O | 8- 3 | 4 | FABRI-TEK | - 1/4 - 5.88 |
| O | 17- 2 | 2 5/8 | FARRINGTON MFG | - 7/8 - 25.00 |
| O | 20- 6 | 6 1/2 | INFORMATION DIS | + 1/2 + 8.33 |
| A | 67- 17 | 21 1/8 | MARSHALL INDUSTRIES | - 2 1/2 - 10.58 |
| A | 84- 15 | 19 1/4 | MILGO ELECTRONICS | + 1 3/4 + 10.00 |
| N | 87- 27 | 31 1/2 | MOHAWK DATA SCI. | - 9 - 22.22 |
| O | 57- 16 | 25 | OPTICAL SCANNING | + 5 + 25.00 |
| O | 17- 4 | 5 3/4 | PHOTON | - 3/8 - 6.12 |
| O | 4- 1 | 1 3/4 | PHOTO-MAGNETIC SYS. | - 1/4 - 12.50 |
| A | 42- 23 | 26 1/8 | POTTER INSTRUMENT | - 3/8 - 1.42 |
| O | 25- 12 | 14 1/2 | PRECISION INST. | + 2 1/2 + 20.83 |
| O | 83- 21 | 24 | RECOGNITION EQUIP | ----- |
| O | 34- 6 | 7 | REDCOR CORP. | - 4 1/4 - 37.78 |
| N | 29- 9 | 11 3/8 | SANDERS ASSOCIATES | + 5/8 + 5.81 |
| O | 53- 7 | 9 | SCAN DATA | ----- |
| O | 23- 10 | 11 1/2 | TALLY CORP. | + 1/2 + 4.55 |
| N | 25- 11 | 14 1/8 | TELEX | + 1 5/8 + 13.00 |
| O | 50- 9 | 13 | VIATRON | + 1 3/4 + 15.56 |

SOFTWARE & EDP SERVICES

| EXCH | 1970 RANGE | CLOSING PRICE | WEEK NET CHANGE | WEEK PERCENT CHANGE |
|------|---------------|------------------|-----------------------|---------------------------|
| C | 6- 2 | 2 1/4 | ADVANCED COMP TECH | - 1/2 - 18.18 |
| A | 24- 4 | 5 7/8 | APPLIED DATA RES. | + 1 5/8 + 38.24 |
| O | 18- 4 | 4 1/2 | APPLIED LOGIC | - 3/4 - 14.29 |
| O | 8- 1 | 2 | ARIES | + 1/4 + 14.29 |
| A | 47- 23 | 29 1/4 | AUTOMATIC DATA PRC | + 3 1/8 + 11.96 |
| O | 14- 5 | 5 3/4 | AUTO SCIENCES | - 3/4 - 11.54 |
| O | 9- 2 | 2 1/2 | BANDON APPL SYS | + 1/4 + 11.11 |
| O | 3- 1 | 1 1/4 | COMPUTER AGE INDUS. | + 1/8 + 11.11 |
| A | 12- 2 | 3 1/2 | COMPUTER APPL | + 1/8 + 3.70 |
| O | 14- 3 | 4 | COMPUTER ENVIRON | ----- |
| N | 10- 3 | 3 | COMPUTER INDUS. | ----- |
| O | 13- 3 | 3 1/2 | COMPUTER NETWORK | - 1/2 - 12.50 |
| O | 15- 5 | 8 | COMP. PROPERTY | + 1 1/4 + 18.52 |
| N | 34- 7 | 10 7/8 | COMPUTER SCIENCES | + 1 + 10.13 |
| O | 8- 4 | 4 1/2 | COMPUTER USAGE | ----- |
| A | 75- 18 | 27 3/8 | COMPUTING & SOFT | + 6 1/4 + 29.59 |
| O | 9- 2 | 2 7/8 | COMRESS | - 1/4 - 8.00 |
| O | 14- 2 | 2 3/4 | COMSHARE | - 1 - 26.67 |
| O | 3- 1 | 1 1/4 | CONSOL. ANAL. CENT. | ----- |
| O | 24- 4 | 5 3/8 | DATA AUTOMATION | - 1 1/8 - 17.31 |
| O | 28- 9 | 9 1/2 | DATA PACKAGING | - 3 - 24.00 |
| O | 6- 1 | 1 7/8 | DATAMATION SERVICE | - 1/2 - 21.05 |
| O | 9- 5 | 6 1/4 | DATATAB | ----- |
| O | 4- 1 | 1 3/4 | DIGITEK | ----- |
| O | 13- 5 | 5 3/4 | EDP RESOURCES | ----- |
| A | 11- 5 | 7 3/8 | ELECT COMP PROG | + 1 1/2 + 25.53 |
| O | 161- 31 | 35 | ELECTRONIC DATA SYS. | - 15 - 30.00 |
| O | 20- 4 | 5 | INFORMATICS | - 1/4 - 4.76 |
| A | 25- 6 | 8 3/8 | ITEL | + 3/4 + 9.84 |
| O | 7- 1 | 1 | LEVIN-TOWNSEND SERV. | ----- |
| A | 25- 11 | 13 3/4 | MANAGEMENT DATA | + 1/4 + 1.85 |
| O | 8- 3 | 3 1/4 | NAT. COMP. ANALYSTS | - 1/4 - 7.14 |
| O | 12- 3 | 4 | NAT. COMP. SERV. | - 2 - 22.22 |
| N | 54- 13 | 20 1/2 | PLANNING RESEARCH | + 5 + 32.26 |
| O | 27- 9 | 9 1/2 | PROGRAMMING METHODS | - 1 1/2 - 13.64 |
| O | 5- 2 | 2 1/8 | PROGRAMMING & SYS | - 7/8 - 29.17 |
| O | 33- 3 | 3 1/2 | PROGRAMMING SCIENCES | - 1/4 - 6.67 |
| N | 14- 4 | 5 3/8 | SCIENTIFIC RESOURCES | + 1/2 + 10.26 |
| O | 2- 1 | 1 | SOFTWARE SYSTEMS | ----- |
| O | 27- 7 | 7 1/2 | TRIS COMP CENT INC. | - 1/2 - 6.25 |
| O | 4- 2 | 3 7/8 | UNITED DATA CENTER | + 1/4 + 6.90 |
| N | 99- 19 | 23 3/4 | UNIVERSITY COMP. | + 2 5/8 + 12.43 |
| A | 20- 5 | 7 1/8 | URS SYSTEMS | + 1/2 + 7.55 |
| O | 13- 3 | 3 1/2 | U.S. TIME SHARING | - 2 1/2 - 41.67 |

Earnings Reports

CTC COMPUTER CORP.

Year Ended Dec. 31

| | 1969 | 1968 |
|---------|-------------|-------|
| Revenue | \$3,724,385 | |
| Loss | 810,168 | |

AUTOMATION INDUSTRIES

Three Months Ended Mar. 31

| | 1970 | 1969 |
|------------|------------|------------|
| aShr Ernd | \$.08 | b\$.19 |
| Revenue | 49,947,000 | 37,797,000 |
| Spec Items | 2,495,000 | c89,000 |
| Loss | 1,819,000 | e1,675,000 |

a-Based on income before special items and on average common and common equivalent shares. b-Adjusted for a two-for-one stock split in May, 1969. c-Credit from tax loss in May, 1969 carry-forward. d-Debit; anticipated losses from sale in April of certain surplus product lines and additional estimated losses resulting from decisions also made in April to shut down and consolidate several facilities. e-Income equal to 20 cents a share.

SCIENTIFIC COMPUTERS INC.

Nine Months Ended Mar. 31

| | 1970 | 1969 |
|-----------|-----------|-----------|
| Shr Ernd | \$.10 | a\$.11 |
| Revenue | 2,607,006 | 2,398,018 |
| Spec Cred | | b50,000 |
| Earnings | 78,324 | c141,915 |

a-Based on income before special credit. b-Provision for income taxes no longer required. c-Equal to 17 cents a share.

TRACOR COMPUTING CORP.

Three Months Ended Mar. 31

| | 1970 | 1969 |
|------------|-------------|-------------|
| Revenue | \$1,721,743 | \$1,663,002 |
| Spec Items | a70,955 | b161,503 |
| Loss | 145,015 | 454,330 |

a-Gain from sale of product division. b-Loss from product division.

INFORMATION DISPLAYS INC.

Three Months Ended Mar. 31

| | 1970 | 1969 |
|-----------|----------|---------|
| aShr Ernd | \$.03 | \$.03 |
| Revenue | b302,252 | 414,361 |
| Earnings | 21,417 | 18,412 |

a-On a primary basis. b-Excludes additions to lease base amounting to approximately \$270,000.

SEISMIC COMPUTING CORP.

Six Months Ended Mar. 31

| | a1970 | b1969 |
|----------|-----------|-----------|
| Shr Ernd | \$.07 | \$.23 |
| Revenue | 7,080,000 | 5,012,000 |
| Earnings | 77,000 | 247,000 |

a-Preliminary. b-Restated by company.

AMER. COMPUTER LEASING

Three Months Ended Mar. 31

| | 1970 | 1969 |
|-----------|-----------|-----------|
| aShr Ernd | \$.10 | \$.13 |
| Revenue | 1,936,157 | 1,661,364 |
| Spec Cred | 146,870 | 73,424 |
| bEarnings | 348,705 | 327,090 |

a-Based on income before special credit. b-Equal to 17 cents a share in 1970 and 16 cents a share in 1969.

HUDSON LEASING CORP.

Three Months Ended Mar. 31

| | 1970 | 1969 |
|-----------|------------|------------|
| Shr Ernd | \$.25 | \$.30 |
| Revenue | 5,822,360 | 4,300,952 |
| Earnings | 390,763 | 366,515 |
| a9 Mo Shr | 1.04 | .70 |
| Revenue | 16,962,342 | 11,535,640 |
| Spec Cred | | 123,611 |
| Earnings | 1,606,296 | b966,992 |

a-Based on income before special credit. b-Equal to 79 cents a share.

BOLT BERANEK & NEUMAN

Nine Months Ended Mar. 31

| | 1970 | 1969 |
|-----------|------------|------------|
| Shr Ernd | \$.23 | \$.22 |
| Revenue | 13,734,000 | 10,562,000 |
| aEarnings | 268,000 | 256,000 |

a-Before extraordinary items. Company said that it anticipates an extraordinary loss of nine cents a share for the year 1970 reflecting special costs of merger proceedings that were terminated and cost of relocation of a Van Nuys, Calif., office taken by eminent domain. For 1969 the company said that there was an extraordinary gain, equal to 25 cents a share, from sale of foreign time-sharing interests and discontinuance of certain unprofitable operations in its domestic business.

We're really talking about the time of day.



Time, the irreplaceable commodity. We're talking about saving it, stretching it, making it, using it. We're talking about software. That gives you the most productive use of time.

Autoflow[®]

We could tell you about the superior qualities of this system. But the facts tell you more. This month, the 1,000th Autoflow system will be installed. The most widely used system in the industry. Recognized as the best flowcharting, documentation, and debugging system available today.

Accepts any program written in COBOL, FORTRAN, PL/1 or Assembly languages. Automatically generates an accurate two-dimensional flowchart as well as auxiliary listings to assist the programmer. Operable on IBM, RCA, and Honeywell computers, Autoflow produces flowcharts and supporting documentation in less time than is humanly possible.

Librarian

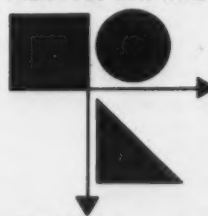
Simple statement: this is the most flexible

and efficient /360 source program retrieval and maintenance system currently available. Updates, stores, maintains, documents, executes, and even protects your source program library (ask us what Librarian did for us after a plane hit our building). Saves programmers' time, saves you beaucoups worrying about mistakes and accidents.

PI Sort

Your "free"/360 sort program may be costing you more time and money than you realize. PI Sort is up to 50% faster. Cuts disk working space in half. Sorts larger files. Eliminates costly tape merges. No retraining necessary.

Completely compatible with DSORT, including identical JCL and Sort control cards. It takes money to make money and takes time to make time. Invest your time in learning how these systems can deliver tangible benefits to your organization. Call or write ADR for full information.



Applied Data Research, Inc.
Route 206 Center, Princeton, N. J. 08540
609-921-8550